JPRS 71855

12 September 1978

USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

No. 35

USSR

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20000412 156

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BIBLIOGRAPHIC DATA SHEET	1. Report No. JPRS 71855	2.	3. Recipient's Accession No.
4. Title and Subtitle USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS - CYBERNETICS, COMPUTERS, AND AUTOMATION TECHNOLOGY, No. 35			5. Report Date 12 September 1978
			6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address Joint Publications Research Service 1000 North Glebe Road Arlington, Virginia 22201			10. Project/Task/Work Unit No.
			11. Contract/Grant No.
12. Sponsoring Organization Name and Address			13. Type of Report & Period Covered
			14.

15. Supplementary Notes

16. Abstracts

The report contains abstracts and news items on theory, design, development and application of analog and digital apparatus, elements and components of control systems, reliability and optimality, information theory, and the theory of automata.

17. Key Words and Document Analysis. 17a. Descriptors

USSR
Eastern Europe
Automation
Automata Theory
Information Theory
Computers
Computer Programming

17b. Identifiers/Open-Ended Terms

17c. COSATI Field/Group   6D, 9B, 9D

18. Availability Statement Unlimited Availability Sold by NTIS Springfield, Virginia 22151	19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 122
	20. Security Class (This Page) UNCLASSIFIED	22. $A\phi 6$

FORM NTIS-35 (10-70)   USCOMM-DC 40329-P71

USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

No. 35

This serial publication contains abstracts of articles and news items from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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I. DEVELOPMENT AND PRODUCTION OF COMPUTERS AND CONTROL EQUIPMENT

A. General Treatment

MOISEYEV, NIKITA NIKOLAYEVICH, corresponding member, USSR Academy of Sciences, assistant to the director, Computing Center [VTs],USSR Academy of Sciences, Moscow

[Abstract] It is pointed out that the capitalist economic system is incapable of coping with many of the problems of today: the energy crisis, the environment, stagflation and other problems cannot be solved by an economic system which is based on the application of the power of constituents, when the constituents include large corporations. The policies implemented by such a system degenerate to policies which reinforce the power and earnings of the corporations, to the detriment of the population. Only a socialist, planned economy can cope with such problems. However, the increasing complexity of the tasks faced by planners requires basic research into the planning process. Traditional methods of economic analysis are incapable of describing, much less solving, economic problems with the great variety of factors and interconnections and the tremendous volumes of information characteristic for economic problems today. More general approaches and methods are needed, requiring a language allowing uniform description of various processes in which man participates, a language reflecting primarily the dynamic nature of economic processes. This article is dedicated to the discussion of problems of this description and certain methods of analysis. Examples are selected to illustrate the problems. The formalization suggested is rather universal, describing the situation which arises upon evaluation of long-term plans for regional development and the solution of various problems of international economic cooperation and, possibly, provides a basis for the construction of a mathematical model of coexistance. The author concludes that the development of systems allowing man-machine dialogue does not decrease, but rather increase the complexity of the systems involved, simply shifting the complexity to another sphere, where it is invisible to the human utilizing the system. Figures 5; references 3: 2 Russian, 1 Western.

USSR

AUTOMATED SYSTEM FOR CREATION OF SECOND-GENERATION ROBOTS AT CYBERNETICS
INSTITUTE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("Steps of the 'Thinking'
Robot") 13 Jun 78 p 6

CHARMARA, V.

[Text] Kiev--An automated system for the creation of second-generation
robots has been constructed at the Cybernetics Institute, Ukrainian Academy
of Sciences. It recognizes both individual words and structured speech and
has its own "voice."

Academician V. Glushkov, director of the institute, says, "We are working
on teaching robots languages and a 'rational' approach to various problems.
In some fields of knowledge we already have the ability to devise algorithms
by means of which a machine can learn faster than even a very capable man.
I won't conceal the fact that our goal is to invent a 'thinking' robot by
the year 2000. I believe that it will find application on assembly conveyors
and with machine tools."

B. Problem Areas

POLAND

OPERATIONAL DEPENDABILITY OF COMPUTER SYSTEMS

ZAMOJSKIY, WOJCIECH, Institute of Technical Cybernetics, Wroclaw Polytechnic

[Abstract] The causes are analyzed and characteristics described of the malfunction of computer systems during their operation. It is divided into two classes: ireversible damage and transitory malfunction, for which remedies are suggested. The ways and means to ensure dependable functioning of computer systems are also discussed.

USSR

OUTPUT OF AUTOMATED MANAGEMENT SYSTEMS TO BE INCREASED

SAMBORSKIY, G., professor, dr in economic sciences; and BODYANSKAYA, advisor to the State Committee on Science and Technology, Moscow

[Text] At the Second All-Union Conference held in Moscow on the Application of Computer Technology and Automated Management Systems [ASU] to the National Economy, it was noted that during the Ninth Five-Year Plan and for the first two years of the Tenth a significant step had been taken in our country to create and assimilate high-speed computer technology. Presently, 3,482 various-purpose ASU and 2,849 computer centers are operating in our national economy. Every second computer has been installed in industry. Most of them are in machine-building: 18 percent of all establishments, whose share comes to half the production in this sector, have introduced ASU. The total capacity of electronic computers [EVM] is growing rapidly. For last year alone the operation speed of computer center machines increased by approximately 25 percent. The qualitative indicators of computer technology use in production have also improved significantly, and its output has increased.

Nonetheless, an analysis of the work of automated systems indicates that all the richest application possibilities for EVM are far from having been used to influence management efficiency and quality to the necessary extent. In particular, judging by data from the latest check of 80 ASU, each of them consists on the average of five subsystems (instead of 12-14 in the total capacity). On the average, 27 problems can be resolved with their help. These ASU still do not exert a great influence.

The duty factor of the EVM is also insufficient. For the past 5 years it has grown in all on the average of from 10.5 to 11.7 hours per day (out of a possible 18 hours). At some establishments, for example at the Orsk Tractor Trailer Plant and the L'vov Automatic Loaders Plant, the YeS-1022 machines are operated not more than 4 hours per 24. They are used best of all at the "GAZ" [Gor'kiy Automobile Plant] production association and the Yaroslavl' Motor Plant. There, their loading reaches 13 hours per 24 on the average for the year.

Computers are insufficiently used in solving planning and administrative problems. According to data for the last Five-Year Plan, 75 percent of the problems solved on ASU were accounting and statistical, 20-24 percent were planning and economic, and only 1-5 percent were optimization problems. Over the past 2 years the situation has changed but little.

An important structural improvement has now been outlined in the development of ASU. Thrust into the foreground has been the problem, not so much of creating new ASU for production (during the present Five-Year Plan their number will increase to 1,350), as providing for the complete assimilation of systems already introduced and re-equipping them with more productive machinery, the type that permits solving complicated problems, particularly optimization ones.

At the same time the rate at which automated enterprise management systems [ASUP] are being created is increasing. At present, more than a thousand of them are in operation. For the end of the Five-Year Plan 950 such systems will have been introduced--almost as many as have been created over the preceding 7 years. These systems will be based on micro-EVM. They are advantageously different from modern technological process control machines as to dimensions, weight, and, most importantly, as to cost. Micro-EVM and microprocessors offer the possibility of automating management not only of technological processes but of individual objects--conveyor lines, assemblies, installations, or machine tools with numerical program control [ChPU]. Outlays for these systems pay for themselves fairly quickly--in approximately a year.

Over the Five-Year Plan several thousand new EVM will be put into operation. These are third-generation machines. The majority of them have been designated to replace the obsolete, less productive ones. Naturally, the wide application of powerful, quick-response machines will require us to increase the efficiency of their use in ASU. What are the means for doing this?

Above all it is necessary to increase the orientation of ASUP toward solving optimization problems. According to some estimates, the optimization of, for example, the development of the plastics industry up to 1980 will make it possible to save 1.35 billion rubles in capital investments. And optimized calculations on the disposition of orders for metal (taking wide variety into account) according to metallurgical establishments make it possible to organize the load of rolling mills in such a way that for a year alone it is possible to obtain an additional 80 thousand tons of ferrous metal stock and 8 thousand tons of non-ferrous metal. At the Minpribor [Ministry of Instrument Making, Automation Equipment and Control Systems] the optimized calculation on the output plan for production over the Five-Year Plan allowed the increase of production assignments by 12-15 percent in comparison with a plan variant compiled by usual methods.

So far about 300 optimization problems have been introduced into operating ASU. Half of them are being solved in sectional management systems. Most of all these problems have been developed and introduced into the USSR Minpishcheprom [Ministry of the Food Industry], Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises], and Mingazprom [Ministry of the Gas Industry]. At the Minelektrotekhprom [Ministry of the Electrical Equipment Industry and Power Machine Building] each tenth problem solved

in an ASUP is an optimization problem. A good example of the efficient use of computer technology has been provided by the developers of the ASU at the Izmail' combine of the USSR Minpishcheprom. Forty-four problems are being solved there, including 15 optimization ones.

However, the propagation of developed optimization problems is extremely inadequate. Two out of every three are applied only in one organization, and the counted units in 10 or more. The absence of a set of standards for planning at establishments, associations, and sectors has its effect. Without them, EVM cannot compute real variants of planning indicators.

The introduction of optimized calculations into planning and economic operations requires overcoming departmental and local barriers. The fact is that related sectors are not interested in providing an effect for each other and are not bound to take into consideration that caused by subcontractors in developing and fulfilling their own plan. As an example, agencies of the Gossnab [State Committee of the Council of Ministers, USSR, for Material and Technical Supply] have compiled with the help of an EVM an optimal variant of order disposition for the production of passenger car tires. The savings is estimated at one million 200,000 rubles. Transportation expenditures are also cut. However, this optimization effect is not considered in the plans by either the tire producer or the transportation organizations.

Another means of increasing the efficiency of computer technology in control is by improving the technology of data processing on EVM. It is known that in preparing data on magnetic carriers wastes in these operations decrease by 50 percent, the operator's labor productivity increases by almost twice, and the speed of data input into the EVM increases by more than twice. But, as has been noted by the Second All-Union Conference, there presently are not enough devices for preparing data on magnetic tapes with a connection to an EVM and readout apparatus. There are very few (illegible-Trans.) and graph plotters. The quality of the magnetic tape, punch cards and tapes, paper and other materials necessary for the operation of the EVM and its spare parts leaves much to be desired. Software is being improved slowly. There are not enough programs. The "Center Program System," created at the Minpribor NPO [Scientific-industrial association], slowly makes a mass of its work—requests for programs are being half-satisfied.

There are organizational and methodological difficulties. All the ASU are presently adapted for planning and management documents and procedures developed without consideration of the specific features of computer technology. For example, the most important condition for increasing the efficiency of ASU in construction is the unification of planning estimates. It is presently compiled according to consolidated norms, and not in custom estimates. Thus, the estimate does not contain information on the volumes of construction and assembly operations according to types in a natural expression. As a result it is impossible to automate the formation of

production documentation (including job authorizations at work) based on an estimate for the object.

Quite a few ASUP and computer centers have been created in a number of industrial sectors. This has had an influence on the qualitative content of managerial work, but has been weakly reflected in the number of administrative-managerial personnel. In particular, 23 ASUP and 32 computer centers operate in machine-building for the light and food industries. But the actual number of the administrative apparatus is not changing. One reason is that many documents received directly from EVM have to be manually transferred to standard accounting, reporting, and planning forms. Although in general a large amount of data cannot be outputted on paper, it can be preserved in the EVM's memory and obtained on display or by means of a printout when it is ready. As long as these questions are not resolved, it is difficult to count on a decrease in the man-hours per job in managerial work and, this means, on lowering the need for administrative and managerial personnel.

An important reserve for increasing ASU efficiency is the decrease of current expenditures on its functioning and on maintaining an EVM. Presently, such expenditures for one system come, on the average, to 150-200 thousand rubles per year. Calculations indicate that they could be cut almost in half if we were to provide for a higher level of centralized service by computer technology. To do this it is necessary to concentrate our resources on various materials and spare parts for EVM in one distribution organization.

The greatest reserve for increasing the efficiency of using EVM is a steeper and more profound transition to a system for their collective use. This transition has already begun, but, as analysis proves, it is not going rapidly enough. By 1980 six collective-use computer centers (VTsKP) are to be created--in Minsk, Riga, Leningrad, Tula, Tomsk, and Tallin.

In the future it will be possible to creat 45 more such centers. It is proposed to unite them for joint operation in automatic conditions with computer centers at enterprises, ministries, and departments through high-speed communications channels. According to calculations, it is advisable to create a total of 200 VTsKP. Equipped with EVM having a capacity of up to 20 million operations per second, they will be able to serve about 600 thousand enterprises and organizations subordinate to various departments.

The efficiency of these centers can be judged by the experience of the operation of the group computer center in the Minstankoprom [Ministry of Machine Tool and Tool Building Industry] in Khar'kov, which serves 13 establishments and planning and design organizations. Or take, for example, the "ASU-neft" [ASU Petroleum] of the Minnefteprom [Ministry of the Petroleum Industry]. This system provides continuous--direct and feedback--communication between subscribers distributed in different regions of the country.

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As calculations prove, the creation of computer centers and automated collective-use management systems diminishes the need for large and expensive EVM. An increase in reliability is guaranteed, and the machines' power consumption is decreased. Production areas are economized. The information obtained through ASU becomes several times cheaper, while the relative capital investments are decreased by 30 percent. It is obvious that the further development of this tendency will permit us to increase significantly the load of computer technology and extend the output from the use of ASU.

C. Production Plants

POLAND

USE OF MICROCOMPUTERS IN BUILDING INDUSTRY ADVOCATED

JANIAK, CZESLAW, and SZULC, KRZYSZTOF [Affiliation not given]

[Abstract] Two units of the Gdansk Electronic Computing Technology Enter-
prise of the Building Industry ETOB: a Gdansk unit operating in Gdansk and
Elblag voivodeships, and the Olsztyn unit which operates in Olsztyn, Ostro-
leka, and Ciechanow voivodeships, are servicing about 100 building enter-
prises, handling great quantities of data which are being processed with
ODRA 1300 computers. However, despite its unquestionable value, the model
of centralized information service thus introduced does not ensure to its
users the topicalness of the processed data, necessary for the production
activity. This can be remedies by the improvement in distribution of informa-
tion through the introduction of MERA minicomputers. The ways and means to
achieve this are suggested and discussed.

USSR

NEW EXTERNAL MEMORY UNITS IN SERIES PRODUCTION

Moscow EKONOMICHESKAYA GAZETA in Russian No 17, Apr 78 p 22

[Text] Odessa. The staff of the Odessa Plant of Peripheral Equipment and
External Devices has begun series production of new memory units. The first
consigment of the A-311-4 external memory modules has already been shipped
away for use in the "Olimpiada-80" automated control system. The new units
will find widespread use in machine building, aircraft construction, geologi-
cal prospecting, and at oil fields.

D. Unified System or Ryad Series

POLAND

A NEW SOVIET EC 1035 COMPUTER OF THE JS EMC SYSTEM [UNIFORM SYSTEM OF DIGITAL COMPUTERS]

KLEPACZ, WLADYSLAW (Prepared to Rechentechnik-Datenverarbeitung) [Affiliation not given]

[Text] At the beginning of 1977 an official information was received that a new computer of the JS EMC series has been developed in the Soviet Union. This computer will replace the present R-30 model and as compared with it shows a number of substantial improvements, especially in the modernization of its design and technology and the expansion of software.

In the first place one should note the following improvements:
- microprogrammed storage, providing a simple and convenient change in the system; program input into this storage is automatic or by the operator,
- virtual storage, making possible utilization by the programmer of up to 16 million bytes per program; this storage considerably accelerates elaboration and simplifies construction of one's own programs,
- autodiagnosis system permitting automatic determination and indication of disturbances in the functioning of computer; this system shortens the period of making it operational, reduces the number of keepers, and makes it possible to organize special technical service; the speed of operation of the system permits a thorough check of the performance of the central unit of the computer within 7-10 minutes and a precise and accurate localization of damages, and ensures an easy and rapid elimination of them; information concerning damages is printed by an electric typewriter;
- possibility of multiplexer work, permitting better utilization of selector channel;
- expansion of interrupt system thanks to introduction of new kinds of interrupts and improvement of the range of information content of interrupted programs;
- recording of the following steps of operation of programs, permitting their testing:
- positive execution of branch instructions,
- updating of definite registers,
- updating according to definite addresses of operating storage,
- selection of instructions according to definite addresses of the operating storage,
- great accuracy of floating point operations, resulting from new arithmetic instructions permitting elaboration of 128-long operands,
- possibility of repetitions in case of errors of the central unit eliminates the problem of accidental errors without affecting efficiency of the system; each error in the operation of circuits of the central unit, ascertained during execution of instructions, causes an eightfold repetition of the operation before the final interrupt by the supervisory system, and the ascertained errors are recorded for the purpose of analyses,

- automatic correction of individual memory fields in case of the occurrence of errors in operating and microprogrammed storages, complete programming compatibility with computers MINSK 32 and other JS EMC models; this is especially important because of considerable programming assets and numerous users of MINSK 32 computers,
- channel adapter, permitting direct connection with three computers, even of different types (including MINSK 32),
- built-in adapter of data sets, acting as a control unit of magnetic disk storage and ensuring data transmission from disk to internal storage at a speed of 312 K bytes/s.

Characteristics of operational and technological parameters of EC 1035 computer and its individual modules are as follows:
- power supply: 3-phase 380/220 v, 50 Hz,
- input power: up to 41 kva (for basic configuration),
- surface required: about 110 m^2,
- floor load: up to 700 kg/m^2,
- temperature: 5-40°C (optimum 20°C $\pm$ 5°C),
- relative humidity: 65 $\pm$ 15 percent.

Central Unit 2635

Number of instructions: 172
Fixed point, floating point, and decimal arithmetic, logic operations, instructions of remote data processing and control and elaboration of 16 M byte long blocks. Instructions format: RR, RX, RS, RI, S, SS.
Data format: byte, half-word (two bytes), word (four bytes), double-length word (eight bytes), and four-length word (16 bytes).
Running speed: 160-180,000 operations/s
Internal storage capacity: 256-1000 K bytes

EC 2435 Processor

The processor base is formed by a control unit of microprograms with semiconductor memory of 48 K byte capacity. The input of all control information to this storage is effected from a special EC 5009 memory located on the operator's desk.

Multiplexer Channel

Number of subchannels: 16-128
Data flow rate: in multiplexer work - 40 K byte/s, and in block transfer - 120 K byte/s
Maximum number of peripheral units: 248
Maximum number of peripheral equipment control units: 8

Selector Channels

Number of channels: 4
Data flow rate: 1 M byte/s
Maximum number of peripheral equipment control units per channel: 8

EC 3237 Internal Storage
Cycle: 2 μs
Capacity: 256-512 K bytes

EC 3235 Internal Storage
Cycle: 0.8 μs
Capacity: 256-1000 K bytes
Use of EC 3235 storage increases mean speed of control unit operation to
about 200,000 operations/s and also increases throughout capacity of channels

Software
Software of EC 1035 computer comprises various versions of operational systems
DOS/JS and OS/JS EMC, processing programs, and a set of technical maintenance
programs.
Operational systems comprise both the versions used in models of the 1st
generation of JS EMC (DOS-2 and OS-4) and those designed for models of the
2nd generation.

DOS/JS EMC operational system comprises:
1) control programs:
- supervisory program
- tasks management
- initial input

2) input/output control system

3) service programs:
- connecting program
- library management
- annulment programs
- annulment macroinstructions
- sorting on magnetic tapes and disks
- testing tools
- reporting programs execution run
- determination of notations that identify cylinders
- conduct of programs records
- unloading programs generator
- programmed check solutions
- self-contained STARTER program

4) translators:
- ASSEMBLER
- BASIC-FORTRAN

- FORTRAN
- RPG
- PL/1
- COBOL

5) system of programmed compatibility with MINSK 22 computer

6) data transmission programs

OS/JS EMC operational system comprises:
1) control programs:
- original loading program
- control program nucleus initiating program
- tasks management
- supervisory program
- data management

2) utility programs:
- combination of programs
- loading program
- testing tools
- sorting/combining
- technical service programs

3) translators:
- ASSEMBLER
- ALGOL
- COBOL
- PL/1
- RPG

Basic Configuration

Basic configuration of EC 1035 computer comprises the following moduli:
- EC 2635 central unit
- processor with 1 multiplexer channel and 2 selector channels
- EC 3237 or 3235 internal storage of 256 K byte capacity each
- EC 0835 central unit power supply
- EC 5009 microprograms loading storage
- EC 1535 control desk with EC 1535 typewriter
- peripheral equipment:
- EC 5517 magnetic tape storage control unit
- 3 EC 5017 magnetic tape storage units
- EC 5561 magnetic disk storage control unit
- 3 EC 5061 magnetic disk storage units
- EC 6012 punched card reader
- EC 6022 punched tape reader
- EC 7010 card puncher
- EC 7022 tape puncher
- EC 7032 line printer

Data Preparation Equipment

EC basic configuration is supplemented by following data preparation devices:
- 1 EC 9011 punched card printer
- 1 EC 9024 punched tape preparation device

USSR UDC 462--462.621.774.65

ANALYSIS OF THE ORDER FILE IN THE ENTERPRISE AUTOMATED MANAGEMENT SYSTEM OF A
PIPE PLANT USING THE YeS SYSTEM OF COMPUTERS

KUZNETSOV, V. A. and SLABAYA, L. A., engineers

[Abstract] A description of the running of a task entitled "Analysis of the
Order File," performed at a number of pipe plants, is presented as an example
of a typical plant problem run on a YeS computer. The input information is
the order file, recorded on a magnetic disc in a standardized form. The
method of organization of the file is sequential: each record contains a
complete description of the product ordered and the quantity required. The
sequence of operations performed by the enterprise automated management sys-
tem (ASUP) is listed. The software required for the task was written for the
YeS-102 computer and run under the supervision of the YeS disc operating sys-
tem, requiring 70 K of main memory, a control panel typewriter, a YeS 5056 disc
drive and a punch card reader.

USSR

INTERFACING OF UNIFIED ELECTRONIC COMPUTER SYSTEM WITH AUTOMATED DESIGNER'S
WORK STATION IN THE "CURVE" MODE

PUTYATIN, A. P.

[Abstract] Oscillograms, seismograms and other graphic information obtained
at the designer's automated work station (ARM) cannot be fed into a computer
because the computer code and graphics code do not match. A program was de-
vised for interfacing the ARM with the YeS-1020 electronic computer. The func-
tion of processing graphics information was realized by tracing the graphics
with a magnetic pencil in the "curve" mode, then recoding the data into the
computer unified system (YeS) code. Eight directional codes are the basis for
approximating with the magnetic pencil the outline of the graphics; direction-
al coding is registered for each 1 mm of the graphics outline. As for the
designer's automated work station, its equipment and software is intended for
compiling graphics documentation and texts documentation broken down into
graphics outlines. The designer's work station is made up of a graphic-sketch

automatic unit, a graphics information converter, tape drive, standard input/
output devices and a semiautomatic unit for coding graphics information. The
program is written in Assembler language, with a Fortran output routine. Fig-
ures 2; references 1 (Russian).

GDR/USSR

AUTOMATED SYSTEM IN SIGHT [FOR PLANNING AND ADMINISTRATION IN THE SOVIET
ECONOMY]

YEVELIN, LEONID, Moscow

[Abstract] The status of the work in the Soviet Union aimed at the develop-
ment of an automated state system for economic planning and management (OGAS)
is briefly described. The core unit of the system, the first electronic data-
processing system in the world to handle an entire country's economy, is the
automated system for plan accounting (ASPR), which has already been developed.
In this article, Nikolai Pavlovich Lebedinski, deputy chairman of the State
Planning Committee of the Soviet Union and head of one of the computer centers,
briefly outlines the system, stressing the performance advantages to the econo-
my, and the savings realized by its implementation.
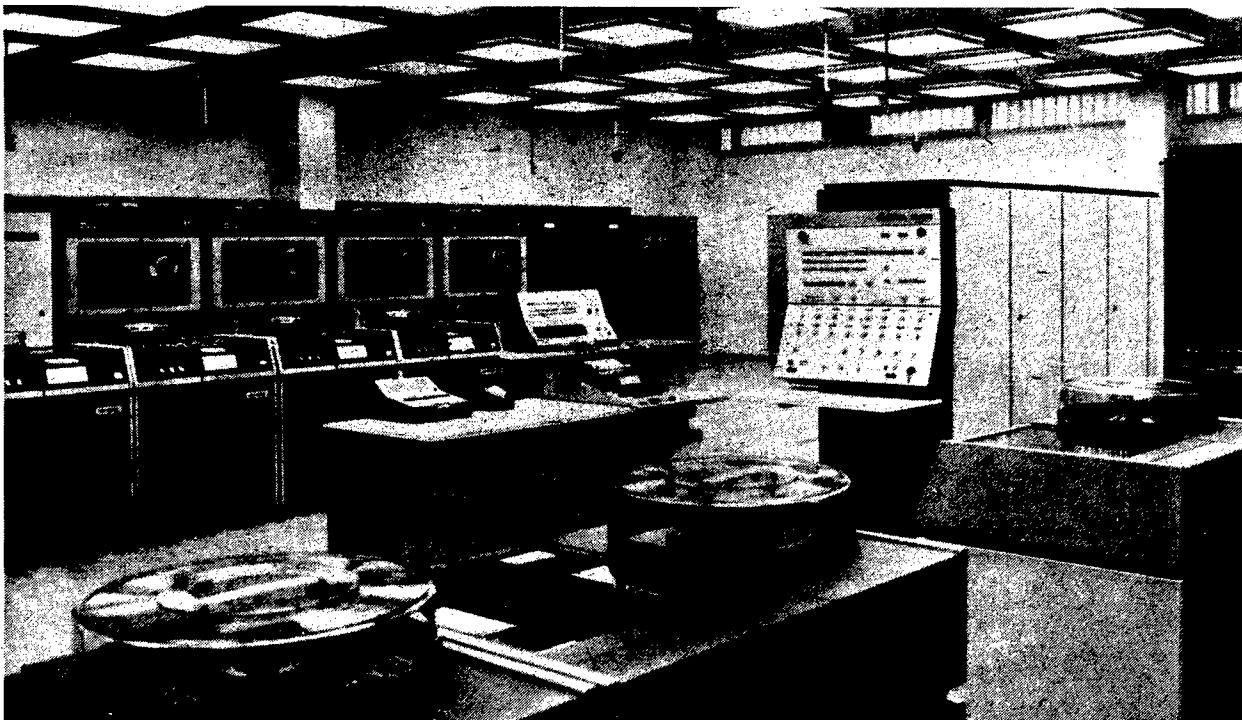
The EC 1040 computer, used in many computer centers in the CEMA, is made by the ROBOTRON Combine State Enterprise; it is one of the tried and tested units of the unified electronic computer system of the socialist block.

USSR

NEW THIRD-GENERATION YeS COMPUTER IN OPERATION AT SIBERIAN DEPARTMENT, ACADEMY OF SCIENCES USSR

Moscow IZVESTIYA in Russian("Flag Officer of Cybernetics") 28 Jul 78 p 1

[Abstract] Novosibirsk--A new third-generation computer of the YeS series has gone into operation at the computer center of the Siberian Department of the Academy of Sciences USSR.

The computer center has almost 100 clients, including industrial enterprises from Novosibirsk and other cities, a design bureau, scientific-research institutes from various ministries and departments, and institutes. The group of computers solves about 1100 problems daily. Specialists at the Computation Center have created automated systems for production management, geological prospecting, transportation development, publishing, information-reference systems for magazines and other fields.

The center's machines are increasing in both number and quality. A multi-processor computer complex which can complete up to 100 million operations per second will soon go into operation.

E.   Hardware

POLAND

SAD DATA BASE MANAGEMENT SYSTEM

MARDAL, WLODZIMIERZ and WIERZBOWSKIY, JAN, Institute of Computers, Warsaw

[Abstract] The "SAD" data management system designed for use with R 32 computers at the Institute of Computers in Warsaw is characterized in detail. A description is given of the structure of the system and the main document file, of different types of documents, auxiliary files, macroinstructions, data protection, and universal utility programs to facilitate use of the system. Figures 4; tables 4; references 4 (Polish).

USSR   UDC   681.3.06.44:681.3.51/6.42

THE ASPROM AUTOMATED MICROPROGRAMMING SYSTEM

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KERZHENEVICH, BORIS IL'ICH, engineer, NPO [Scientific-Industrial Association]
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Department] "Elektronmash" (Kiev)

[Abstract] The extensive utilization of microprogramming in planning practice
has set forth the task of creation of hardware to support the method, and
methods of preparation of microprograms or, more precisely, means for devel-
opment of the structure of information storage in control memory. The Auto-
mated System for Planning of Microprograms [ASPROM], created to perform this
task, performs the following main functions: archive creation, coding, an-
alysis and documentation of microprograms. This article describes the gener-
al characteristics of the system, requirements which must be met by the sys-
tem, and the data base utilized by the system, including language support,
standardized data structures and formats for input and output documents.
Several output languages of the system are described. A portion of a symbol-
ic microprogram is presented, as well as a flowchart illustrating the struc-
ture of the system software and a diagram of the process of synchronous cor-
rection. The software for ASPROM is written in assembler language (about
20,000 operators) and has been used in microprogramming of two different de-
vices. References 8: 7 Russian, 1 Western.

A SOFTWARE PLUS HARDWARE SYSTEM FOR SUPPORTING THE JOINT OPERATION OF THE
M6000 AND MIR-2 ELECTRONIC COMPUTERS

KOROSTIL', YURIY MIROSLAVOVICH; STARIK, YURIY ALEKSANDROVICH; DOBROVOL'SKIY,
VITALIY STANISLAVOVICH, and TSYGANKOV, YURIY KONSTANTINOVICH, engineers, VNII
Svarochnogo pr-va [All-Union Scientific Research Institute of Welding] (Kiev)

[Abstract] A device is suggested which allows hardware interconnection of
an MIR-2 machine with any other machine having at least 12 information wires
in its interconnection bus. A number of programs are also analyzed, support-
ing the joint operation of an M6000 central processor and an MIR-2 machine
as a peripheral processor within the framework of the basic control system
of the M6000, to support real-time operation of the M6000. The M6000-MIR-2
driver is designed for operation as a component part of a basic control sys-
tem and supports information in exchange between the machines. The driver
is based on a standard system of I/O routines. Figures 2.

POLAND

MICROPROCESSORS--PRESENT STATE AND DEVELOPMENT TRENDS. PART 1.

SINKIEWICZ, TADEUSZ, Institute of Computers, Warsaw

[Abstract] The paper describes the basic characteristics of modern micro-processors and microcomputers, classified according to their construction (monolithic, modular, segmental), technology (unipolar, bipolar), archi-tecture (word length, internal organization, control system), number and type of statements (for microprocessors with fixed number of statements), and operation speed. Table 1; figures 3.

Dr. Engr. Tadeusz Sinkiewicz graduated in 1961 from the Department of Auto-mation and Computing Technology of the Moscow Power Engineering Institute, and was employed at the Institute of Computers, Warsaw, in designing basic digital systems, testing equipment, and computing blocks. In 1974, he de-fended at the Warsaw Polytechnic his doctorate's thesis on modeling switch-ing networks dynamics. At present he is occupied with problems of design and applications of microprocessing systems.

ONE METHOD OF PROOF OF THE CORRECTNESS OF PROGRAMS

KOSTYRKO, VASILIY STEPANOVICH, engineer, Computing Center, L'vev Branch of
Mathematic Physics of the Institute of Mathematics, Academy of Sciences Ukr SSR

[Abstract] A method is presented for proving properties of programs in ALGOL-
like languages with nonrecursive procedures. The hardware necessary for ap-
plication of the method is described. The method can be used to prove the
properties of algorithms arising in the process of structuring of programs.
An example is presented, utilizing the language ANALITIK. The author thanks
A. A. Letichevskiy and A. V. Godlevskiy for attention to the work and valuable
council. Figures 2; references 9: 6 Russian, 3 Western.

GENERAL PRINCIPLES OF THE DESIGN OF HIERARCHICAL MULTIPLE-MODULE STRUCTURES

GLUSHKOV, VIKTOR MIKHAYLOVICH, academician, Director Institute of Cybernetics,
Ukr SSR Academy of Sciences, Kiev; IVAS'KIV, YURIY LUKICH, candidate in tech-
nical sciences, senior research worker, Institute of Cybernetics, Ukr SSR
Academy of Sciences, Kiev; and BELYAVSKIY, VIKTOR LEYBOVICH, engineer, Insti-
tute of Cybernetics, Ukr SSR Academy of Sciences, Kiev

[Abstract] A study is made of a class of computer devices allowing maximum
deparalleling of the computational process to be combined with adaptation of
the structure of devices to the structure of the input actions. Deparallel-
ing is achieved by the use of multiple-module structure, made adaptive by
their hierarchical organization. The general principles of hierarchical or-
ganization are: separation of modules into processing and switching types;
functional orientation of processing modules; problem orientation of func-
tional modules, considering the specifics of the tasks performed; functional
distribution of control of the structures; hierarchical organization of the
set of switching modules; homogeneity of vertical and horizontal connections
between modules; organization of arbitrary interaction of an unlimited number
of pairs of functionally oriented modules, with limitations on the complexity
of switching modules; adaptiveness of organization of connections between
functional modules; and the use of virtual adaptive connections between func-
tionally oriented modules. The principles suggested allow the construction

of structures in which the delay in transmission of information between func-
tional modules is linearly proportional to the number of such modules and the
use of a single approach to the structure organization of computer systems
over a broad range of productivities. Tables 2; references 17: 13 Russian,
4 Western.

ONE APPROACH TO EFFECTIVE ORGANIZATION OF THE FUNCTIONING OF COMPUTER SYSTEMS
WITH REDUNDANCY

POGOSYAN, IGOR'ABRAMOVICH, candidate in technical sciences, Senior Research
Worker, Institute of Cybernetics, Academy of Sciences Ukr SSR, Kiev; KASYAN,
ARINA ARMENAKOVNA, senior engineer, Institute of Cybernetics, Academy of
Sciences UkrSSR, Kiev; MASHKIN, VALERIY IOSIFOVICH, graduate student, Moscow
State University

[Abstract] An effective algorithm is presented for organization of the func-
tioning of a computer system with redundancy. Redundancy allows minimiza-
tion of failures in the system as a result of failure of individual subsys-
tems and elements. In order to solve the problem of effective organization
of redundant systems without excessive hardware purchases, it is desirable
to switch the redundant machine to the parallel-operating mode during high-
load periods, thus increasing productivity while retaining sufficiently high
reliability. A graph of states corresponding to the functioning of such a
system is constructed and investigated. The variation in effectiveness indi-
cators of the system is calculated as a function of the moments of mode
switching, defined by the load on the system. Figures 1; tables 2; references
5 (Russian).

PRINCIPLES OF DESIGN OF SYSTEMS FOR CHECKING AND DIAGNOSIS OF DIGITAL
ELECTRONIC APPARATUS

KLISTORIN, I. F., dr in technical sciences, and PODZIN, A. YE., candidate
in technical sciences

[Abstract] Certain principles are set down for the design of automatic sys-
tems for checking and diagnosis used with computers with various types of
testing of digital electronic apparatus. The types of checking include
parametric checking, logical testing, a test of checking at maximum frequen-
cies and a generalized version of an automated testing system. It is noted
that, depending on the type of testing in each specific case, the system
should include only the necessary hardware. Figures 1; references 7: 6
Russian, 1 Western.

HARDWARE PROBLEMS OF MICROCOMPUTERS IN INDUSTRIAL APPLICATIONS

BYDZOVSKY, JAN, Research Institute of High Voltage Technology, Bechovice

[Abstract] The development of microprocessors and of semiconductor memories
led to their industrial applications in the control of multidimensional sys-
tems in complex logical systems. Production of semiconductor components for
microprocessors is increasing and by 1980 they should represent 25 percent
of the total production of integrated circuits. Microprocessors use eight
byte long words. In East Germany the U 808D microrpocessor is in production;
in Czechoslovakia the equivalent microprocessor I 8008 should enter the pro-
duction stage soon at the TESLA, Roznov plant. Production of static memories
RAM and ROM is also planned. The problems to be solved are concerned with
the theory of numerical controls, of finite automatic devices, and identifi-
cation and optimized control of multidimensional systems. In the hardware
sphere a design for basic functional complexes, the design for input data
circuits, and the design for output circuits for the control of operators
are needed. Exclusive use of domestically produced components is being at-
tempted. Their use is being tested in the JPR 12 microcomputer which is
undergoing operational tests. The software problems include writing of pro-
grams in highly developed languages. Figures 5; references 13: 4 Czech,
9 Western.

USSR

INTELLIGENT TERMINAL DEVELOPED IN UKRAINE

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY (Photo Caption) in Russian No 2,
Mar/Apr 78 photo from inside front cover, caption from p 144

[Text] The photograph shows a terminal processor for the BARS [Basic Appa-
ratus for the Systems Developer, Bazovaya Apparatura Razrabotchika Sistem].
This device is a programmable intelligent multiplexor which makes it possi-
ble to connect series and non-series terminal units to a computer of any
type. It won a gold medal at the Leipzig Fair in March 1978. A license for
this device has been acquired by the People's Republic of Bulgaria, where it
is proposed to begin series production of it during the current year.

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            1978

27

USSR $4$62--5:681.32

MINICOMPUTER-CONTROLLED DIGITAL ELECTROHYDRAULIC ACTUATING DRIVES

SOSONKIN, V. L., dr in technical sciences

[Abstract] In spite of the high speed of modern minicomputers, used to con-
trol industrial robots, machine tools and other numerically controlled ma-
chinery, the large volume of computations may overload the computer, requir-
ing that the operating mechanism "slow down and wait" for the machine to com-
plete calculations before performing its next move. In order to improve
the "compatibility" of computers and the machinery they control, the author
suggests a positive-displacement hydraulic drive system for each coordinate,
operating at a constant carrier frequency, receiving instructions in paral-
lel code directly from the output registers of the computer, thus bypassing
additional digital-analog conversion operations. The process is explained,
and diagrams are presented of a digital 4-bit hydraulic translational motor
and a digital 4-bit hydraulic rotational motor. The use of these devices
greatly simplifies interpolation and the output of numerical instructions
in the form of smooth physical movements by machine elements. Figures 3.

USSR   UDC 621:65.011.56

USE OF NUMERICAL CONTROL TO AUTOMATE MECHANICAL PROCESSING

KOSTIN, A. I., engineer

[Abstract] A brief discussion is presented of the revolution in control
technology which is occurring, resulting from the use of LSI microcircuits
as the hardware in control computers servicing cyclically operating machine
tools. It is noted that the transition from construction of special-purpose
hardware for numerical control of individual machines and operations to the
utilization of standardized, mass-produced microcircuits with individualiza-
tion of the operating cycle of the machine by reprogramming of these standard
units is well underway. Some of the advantages in flexibility and speed of
operation thus achieved are noted.

USSR

STANDARDS FOR COMPUTER HARDWARE AND SOFTWARE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ["Computers and Standards"] 11 Apr 78 p 2

BELYAYEV, V., Tass Observer

[Text] The wide scale introduction of automated management systems [ASU] stipulated by the basic trends of development of the country's national economy for the current Five-Year Plan is based first and foremost on use of advanced economic and mathematical methods and the employment of modern computing equipment. In recent years a great deal has been done to enhance its quality--more than 60 types have been granted the Mark of Quality. It need be noted that in certifying computers for the highest category they are subject to additional requirements. The "YeS-1022" electronics computer, for example, earned the Mark of Quality only when 10 of 24 of its component devices had separately been certified for the highest category.

The growth in output of computing equipment and improvement in its quality have been achieved to a certain extent because of standardization. It is interesting in this regard to refer to the recent past. Before 1965 computing equipment was created from original elements, units and assemblies. In 18 types of arbitrarily selected computers of that period, as analysis has shown, use was made of 14 types of magnetic drum storage devices, eight types of punched-tape reading devices, five types of printing devices and a totally non-interchangeable element base. Hardware diversity unjustifiably raised expenditures for the design of automated management systems [ASU] and the creation of applied programs.

The USSR Gosstandart [State Committee on Standards of the USSR Council of Ministers], scientific establishments and the largest manufacturers of computing equipment came out against such diversity, or more precisely, wastefulness of material resources and engineering labor. Thanks to their efforts, by 1970 about 70 All-Union State Standards were worked out successfully for such products. The standards set general technical requirements for computers and control computer complexes, and for a number of their functional devices. All these documents take maximum account of the requirements and indices of international standards.

Mass introduction of computing equipment demanded standardization of software. The country's largest scientific organizations worked at solving this problem. They developed All-Union State Standards establishing common alphanumerical codes for computers and data transmission apparatus; methods of arranging information on machine carriers; general conditions, phases of development and makeup of programming documentation; and requirements for programming languages.

In the interests of developing the production and utilization of computers, further improvement of efforts toward standardization in this field is demanded. Requirements for auxiliary products and materials still do not always accord with requirements for the computers. There must be additional development and expansion of efforts on standardization of the Unified Computer System, of the peripheral hardware of automated control systems and of software.

It is toward solution of these problems that programs of standardization are being directed. Two of them--"Unified Computer System" and "Common System of Programming Documentation"--are being carried out by engineering collectives of Minradioprom [Ministry of the Radio Industry USSR]. Two others-- "System of Small Electronic Computing Machines" and "Means of Collection, Storage and Use of Information"--are being realized by collectives of Minpribor [Ministry of Instrument Building, Automation Equipment and Control Systems USSR]. Documents on technical standardization are being developed in accordance with the program, "Computers and Data Processing Systems" by radio industry workers and instrument makers together with the USSR Gosstandart. Institutes of the USSR Academy of Sciences and higher educational institutions of the country are participating in carrying out all programs.

In accordance with the programs more than 170 standards of the CEMA and of standardized materials in the area of computer equipment need to be worked out. The standards will create the organizational and technical base for ensuring the technical, information, programming and operating compatibility of computers. They will promote effective economic and scientific and technical collaboration in the development of multilateral specialization and cooperation of computing equipment production.

Realization of the programs approved by the USSR Gosstandart will ensure the creation of systems of machines and devices built on a common base of structure, design, technology and elements, and the development of software and of automated planning and production of new computing equipment.

HYBRID COMPUTER SYSTEM OF THE THIRD GENERATION   ACVK-3

USAKOV, V., dr in technical sciences, professor, PETROV, G., dr in technical sciences, and SUBIN, J., engineer, Scientific and Research Institute of Computer Technology, Moscow

[Abstract] The new hybrid Soviet computer ACVK-3 is a third generation computer, the numerical part of which is provided by the JSEP EC 1010 computer and the analog part is represented by the new Soviet computer AVK-32. This analog component is characterized mainly by a very wide use of integrated circuits; maximum inaccuracies are of the order of 0.02 to 0.05 percent; the limit proper frequencies of solutions are 200 to 500 Hz. The unit is also provided with a partial automation of the connections of the analog calculation network. A Table listing the basic properties of the computer is given. The extent of changes in analog variables is 10; time for integration 10^{-4} to 10^3 secs; inaccuracy of individual operations 0.05 percent; width of frequency zone for individual operations 2,500 to 6,000 Hz. The number of basic operations varies from 20 for integrations to 140 for multiplications with a constant. The unit is equivalent to the USA PACER series computers, Japanese Hitachi 200x, and the Czechoslovak ADT 7000 units. Figures 7; tables 2; references 3: 1 Russian, 2 Western.

ANALYSIS OF INFORMATION CAPACITY OF AN OPTOELECTRONIC RANDOM-ACCESS MEMORY WITH BINARY-DIGIT DATA RECORDING

ZHALEYKO, V. B. and KITOVICH, V. V., Moscow

[Abstract] An optoelectronic random-access memory with bit recording of data has been developed in which the laser beam is split once after deflection and then again after being focused by the objective lens. The second light beam splitter distributes images of equal intensity over all memory plates. The number of memory cells in each chip is equal therefore to the number of positions of the light beam deflector; while the number of chips per memory plate is equal to the capacity of one memory page. This arrangement eliminates the need for a guided transparency, which a holographic memory requires, and the speed of the memory can be made very high by the use of sensitive magnetic or semiconductor materials. The information capacity and the laser power

necessary for such recording are calculated here theoretically. The actual design of such a system with miniature optical components, such as birefringent Wollaston prisms in the first light beam splitter, and with a second light beam splitter (image multiplier) containing a large number of light dividers is shown to be feasible. Figures 4; tables 3; references 4: 2 Russian, 2 Western.

CZECHOSLOVAKIA

UDC 75.00

EPITAXIAL GARNET FILMS FOR MAGNETIC BUBBLE MEMORIES

SIMSOVA, JARMILA, SIMSA, ZDENEK, Institute of Physics of Solids, Czechoslo-
vak Academy of Sciences, Prague

[Abstract] Bubbles are a new magnetic cylindrical domain used as memory
elements. Their price is lower than that of the fast-operating semiconductor
memories, but they are more expensive than the slow high-capacity electro-
mechanical magnetic discs and tapes. The non-magnetic garnets are compounds
of oxides of Nd, Ga, Sm, Gd, Tb, Dy, Er, Al and Y. $Sm_{0.48}Gd_{2.52} \cdot Ga_5O_{12}$, for
example, is typical. The substrate is usually a magnetic garnet layer. Fu-
ture technology will be concerned with preparation of sub-micron size bubbles,
and the development of materials with a higher mobility of the bubbles.
Should such products become reasonably priced it will become possible to pro-
duce memories with record densities exceeding 10^7 bytes/cm^2, with recall
times of below 10^{-8} seconds. At such a time magnetic bubbles will fully re-
place magnetic disc and tape memories. Magnetic garnets contain oxides of
Sm, Tm, Yb, Fe, Lu, Eu, Y, Ca, and Ge. La, Ho, Tb, Ho and Pr can also be
present. The main garnet systems have cylindrical domains, or orthorhombic
anisotropy. Figures 1; tables 4; references 55: 2 Czech, 53 Western.

CZECHOSLOVAKIA   UDC 75.00,85.00

PRESENT DAY TECHNOLOGY OF PRODUCING MAGNETIC BUBBLE MEMORIES

TOMAS, IVAN, Institute for Physics, Czechoslovak Academy of Sciences, Prague

[Abstract] Magnetic memories using bubble domains as recording elements are
discussed. Bubble memories may be designed in the "classical" manner with
sliding recording devices, or with a dense arrangement of bubbles and bubble
memories with a free access way. Bubble memories have recall times on the
order of 10^{-7} seconds for a cost of 0.01 to 0.1 ¢ per byte, compared to
values of 10^{-8} seconds at a cost of 1.0 ¢ per byte for bipolar memories.
Their other advantages are: non-mechanical memory with a continuous record-
ing, even when energy supply is interrupted, low energy consumption (less

than 10^{-6} W/byte, and they have a low volume and low weight. They are highly reliable, less than 10^{-12} frequency of errors, and are shock-resistant. In the past bubble memories were used only in space flight equipment and in military equipment. They are becoming available in standard computer hardware. Figures 14; references 27: 4 Czech, 23 Western.

F. Programming and Software

APPLICATION OF THE METHOD OF PARAMETRIZATION TO THE CONSTRUCTION OF DIALOG-
SYSTEM PROCESSORS

BERESTOVAYA, SVETLANA NIKOLAYEVNA, senior engineer, Institute of Cybernetics,
UkrSSR Academy of Sciences, Kiev; FEREVOZCHIKOVA, OL'GA LEONIDOVNA, junior
research worker, Institute of Cybernetics, UkrSSR Academy of Sciences, Kiev;
YUSHCHENKO, YEKATERINA LOGVINOVNA, associate member UkrSSR Academy of Sci-
ences, Head of Department, Institute of Cybernetics, UkrSSR Academy of Sci-
ences, Kiev

[Abstract] The use of specialized computer languages involves certain diffi-
culties related to the need to develop processors for each language, which
makes the task of automation of the design of processors an important one.
Three main trends have been noted in the development of this problem: prob-
lem-oriented systems, applied program batch generators; macrogenerators and
other expandable programming systems; and metasystems--language processor
generators. In 1973-1975, the Institute of Cybernetics, UkrSSR Academy of
Sciences created an experimental dialog parametric system called DISPROM,
oriented toward generation of software from problem-oriented data processing
languages. This article describes DISPROM and its development, the means
used to describe parameters, the DISPROM metaprocessor and its operation.
Flowcharts are presented to illustrate the operation of the system in vari-
ous environments. Results are presented from an experiment involving pro-
duction of the language YaOD-75, oriented toward the control of homogeneous,
sequentially organized files. Figures 10; tables 1; references 34: 32
Russian, 2 Western.

DIGITAL COMPUTER SOFTWARE FOR MODELING OF DYNAMIC AUTOMATIC CONTROL SYSTEMS

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Institute (Kiev); KRASKEVICH, VALERIY YEVGEN'YEVICH, candidate in technical
sciences, Kiev Polytechnical Institute (Kiev); and BONDARENKO, VIKTOR YEV-
GEN'YEVICH, senior scientific worker, Kiev Polytechnical Institute (Kiev)

[Abstract] This article presents a review of works which are most charac-
teristic of two different trends in the digital computer simulation of con-
trol systems. The first trend is that of development of original linguis-
tic structures within which the model is described, e.g., systems constructed
using the problem-oriented language NEDIS; the second trend, represented by
systems written in DAS and MIDAS, develops linguistic systems for descrip-
tion of models, allowing simulation in the form of structured systems, i.e.,
in a form quite close to that used in analog computer modeling. A system is
described for simulation of dynamic automatic control systems, the input
language of which allows a model to be generated in the form of structural
systems. The system language is compatible with FORTRAN and allows simula-
tion of systems at various levels of detail. The input language developed
is a part of YAMLODIS, a language for modeling of logical-dynamic systems.
The syntax and semantics of YAMLODIS are described. Flowcharts of the
translator and a grammatical analysis routine are presented. Figures 7;
tables 1; references 6: 5 Russian, 1 Western.

A PROGRAM COMPILER FOR A CONTROL MINICOMPUTER

OSIPOV, BOGDAN LEVONOVICH, candidate in technical sciences, MAI [? Moscow
Order of Lenin Aviation Institute imeni Sergo Ordzhonikidze]

[Abstract] The idea of preliminary compiling of minicomputer programs is
becoming increasingly popular. The effectiveness of this approach can be
increased significantly by creating a combined software system including
new languages, using a combined source and object form of representation
of input programs. This article suggests one version of this type of

system and describes a compiler for the software used in a specialized control minicomputer, a part of the software used in an experiment in planning of digital automatic control systems run on a BESM-4 universal computer. The author describes the structure of the software and some characteristics of the minicomputer, a 24-bit single-processor machine with 256 main memory locations each 3 bytes in length and 8K bytes of disc storage (32 pages of 256 bytes each). The machine operates in the fixed-point mode and can work with numbers of variable length: from 1 to 3 bytes. The structure of the compiler is described and a flowchart is presented of the algorithm for interpretation of commutative operations, as well as a block diagram of the general structure of the software for modeling of algorithms and a generation of programs for control of minicomputers. It is concluded that the method of preliminary compiling of programs is an effective means of automation of the programming of minicomputers. Figures 2; references 6 (Russian).

AUTOMATED SYSTEM FOR WRITING OF CONTROL PROGRAMS FOR NUMERICALLY CONTROLLED MACHINE TOOLS IN THE REMOTE PROCESSING AND TIME SHARING MODE ON AN ELECTRONIC COMPUTER

STEPANOV, PETR LEONIDOVICH, candidate in technical sciences, Tomsk Polytechnical Institute (Tomsk)

[Abstract] The industrial experience gained to date in the application of numerically controlled machine tools points to the following main trends for improvement of the process of writing of control programs: increasing the number of computation procedures in order to expand functional capabilities; creation of hardware systems making maximum use of the hardware and software capabilities of modern computers. This article describes the "STOP-1" system, created for the preparation of control programs for machine tools in the remote processing and time sharing mode on a Minsk-32 computer. The STOP-1 system is a component part of the automated management system for technical preparation of production. Operation of the system on a time-shared computer has demonstrated the possibility of reducing the time required to prepare one control program by a factor of 4-5. The economic effect achieved by the introduction of "STOP-1" is about 100,000 rubles per enterprise utilizing the system. The system increases the effectiveness of the use of the universal computer by a factor of 4-5, and also represents a broad area for the use of the computational capabilities of time-shared computer centers for automation of the process of mechanical working.

USSR   UDC 51:681.3.06

THE EQUIVALENCE OF FREE PROGRAMMING SYSTEMS

ITKIN, VLADIMIR EMMANUILOVICH, candidate in physicomathematical sciences,
junior research worker, Computing Center; Siberian Branch of Academy of
Sciences USSR (Novosibirsk)

[Abstract] A new approach is presented to the problem of recognition of
functional equivalents of free standard systems of programs. The basic idea
of the work consists in the construction of a sequence of classes of systems
such that in the first class, functional equivalence coincides with logical-
thermal equivalence, while in subsequent classes, there is weakening and
modification of logical-thermal equivalence; subsequent classes contain some
of the previous classes, while the last coincides with the subclass of free
systems. The concept of the logic graph is introduced, produced from a sys-
tem by discarding operator points. The properties of logic graphs, which
are invariant relative to functionally equivalent transforms of standard
systems, are studied. The concepts of the nodal, simple and singular points
are introduced. The purpose of the classification is to determine those
properties of logic points which characterize their essential features with
respect to functional equivalence, but rest only on the properties of the
logic graph of the system. The classification of logic points and fragments
of systems presented allows the problem to be divided into a number of par-
ticular problems. References 10: 8 Russian, 2 Western.

USSR   UDC 51:681.3.01

ONE APPROACH TO DECREASING THE TIME OF INFORMATION RETRIEVAL

ANDON, FILIPI ILLARIONOVICH, candidate in physicomathematical sciences, mana-
ger, Special Design Bureau [SKB], MMS [expansion unknown], Institute of Cy-
bernetics, Academy of Sciences UkrSSR, Kiev; BASHINSKIY, NIKOLAY ADAMOVICH,
engineer, Special Design Bureau [SKB], MMS [expansion unknown], Institute of
Cybernetics, Academy of Sciences UkrSSR, Kiev

[Abstract] A study is made of one class of encoding functions allowing un-
ambiguous encoding with data reduction, thus allowing a decrease in the quan-
tity of information exchanged between internal and external storage during
information retrieval. Optimal encoding of a file is generally achieved by
a combination of several methods. However, for some files, a single method

can be recommended with confidence. For example, numerical coding is suitable for a file containing only elementary characteristics. If the dictionaries required for encoding are large and the characteristics in each record take on small numbers of values, parallel coding is better. For a file with subordinate characteristics, the elementary segments of which have a large number of elementary values, coding by means of scales is most desirable. Figures 1; references 8 (Russian).

EVALUATION OF THE THROUGHPUT CAPACITY OF AN ELECTRONIC COMPUTER WITH A
FIXED COEFFICIENT OF MULTIPROGRAMMING

DENISOV, I. M., MAKHAREV, E. I. and SOKOLOV, V. V.

[Abstract] An approach to evaluating the effect of the allocation of access to the input-output between peripheral units and the blocking factor of recording on the throughput of a multiprogrammed electronic computer (EVM) is proposed. The following assumptions are made during an evaluation of the throughput of an EVM with a structure of the YeS-1020 EVM type: 1) The problems solved are statistically uniform, i.e., their characteristics are equally distributed random magnitudes; 2) The durations of the continuous steps of handling problems in the processor and peripheral units is distributed according to the exponential law; and 3) The coefficient of multiprogramming, i.e., the number of simultaneously treated problems is a fixed magnitude. The paper was recommended by the Department of Computing Technology, Rizhskiy Institute of Civil Aviation Engineers imeni Lenin Komsomol. Figures 3; references 3 (Russian).

CZECHOSLOVAKIA

SYNTHESIS OF MICROCOMPUTER SOFTWARE

RUZICKA, IVOJ, Research Institute for High Voltage Technology, Bechovice

[Abstract] The problems of using a microcomputer for automatic control of a production process are discussed. The microcomputer must be provided with suitable system software including an assembler translator, text editor, memory loader, program converter, compilator of complex languages (COBOL, FORTRAN, PL/M), simulation programs, monitors, programs for use with the permanent memory PROM and with testing programs. The computer must also be provided with application software which should consist of the algorithms, subprograms for mathematical operations, conversion of numbers from a binary code to BCD and back and subprograms for interruption and restarting of programs. Apart from these subprograms for the control of peripheral items which are important for the control of computers and for the verification of the functioning, numerical controllers should also be provided. The programs should correspond to well defined problems and be divided into simple parts. Algorithms for these parts must be developed and tested. A suitable language must be selected, and full documentation of the program recorded. The assembler is used frequently for programming of microcomputers using complex languages. Usually FORTRAN is used. The JPR 12 computer was used by the author in his study. Figures 3; references 5 (Western).

DEVELOPMENT OF A DATA BANK FOR INDUSTRIAL ENTERPRISES

IVANOV, A. P., candidate in technical sciences

[Abstract] The batch of applied programs for an enterprise automated man-
agement system (PPP ASUP) includes the data bank, programs for planning of
demand, planning of capacity, inventory control and shop management. The
information available to the ASUP consists of six files on magnetic discs:
4 data-base files are created and serviced by the SIOD-1 program, 2 others
are created and serviced by PPP. The composition and purpose of the basic
components of the ASUP are studied, including input files and the applied
programs mentioned above. An annual graph illustrates the time scale of
the various phases of programming and management of the enterprise under
the automated management system [ASU]. Figures 2.

HUNGARY

AGNES, THE PROGRAM PACKET FOR FIXED-ASSET MANAGEMENT

SZILARDI, FERENC, department head, and VARGA, LASZLO, senior deputy depart-
ment head, Computer Applications Research Institute

[Abstract] AGNES stands for Management, Recording, and Statistics of Fixed
Assets. It is a program packet developed to accomplish management informa-
tion functions, capacity calculations, systematic preventive maintenance
schedules, and the like for the optimized handling of fixed assets. In its
third version, it is a versatile system which may be used in a number of in-
dustries without the need for major modifications. Its various segments
handle depreciation, inventory, downtime, capacity calculations, preventive
maintenance schedules, technical specifications, inventory according to cost-
control code, operating time, downtime, production, specific production per
worktime unit, and so forth. The article describes the entry data and forms
on which they are entered, and the overall operation of the system. The fol-
lowing minimum configuration is required: an ESZ [Unified Computer System]
/DOS or IBM 360/DOS operating system, two magnetic disk units for the data
(7.5 Mbyte), a card reader, a line printer, and adequate memory capacity.
The programs are written in the PL/1 language with Assembly modules for
standardizable functions. The system operates satisfactorily at the Diosd
factory of the Agricultural Machinery Works and a number of construction en-
terprises. Figures 6; references 4 (Hungarian).

HUNGARY

DEVELOPMENT AND CHECKING OF THE MICROPROGRAMS OF MICROPROGRAMMABLE MICRO-
PROCESSOR SYSTEMS

AMBROZY, GYORGY, staff scientist, and MISKOLCZKI, JANOS, staff scientist,
Central Research Institute for Physics

[Abstract] In the development and checking system described, the emulated
computer is checked with the aid of a minicomputer, the macrocommands of
the emulated computer and the microcommands developing them being stored in
the minicomputer's memory. Basically, the internal registers of the micro-
processor are packed with the starting values and the registers are read out

after the running of the microprogram portion. The development system is an "intelligent" microprogram memory with a control minicomputer equipped with peripheral units and background memory, an interface providing direct memory access allowing the emulated computer to take the macroprogram and execution microprograms from the operative memory of the control minicomputer. The emulated computer handles the macroprogram memory as if it were its own memory. There is a monitor program to control the development system. Essentially, the checking involves the execution of macrocommands and complete macroprograms. Errors may be corrected with the monitor program. The program loops for checking the circuit elements can be easily prepared with the monitor program itself. Figures 7; references 4: 1 Hungarian, 3 Western.

USSR

PROBABILITY CHARACTERISTICS OF THE PERFORMANCE OF A COMPUTER DURING PROGRAM
AND PROGRAM-BUILT IN CHECKS OF FAILURE DETECTION

KAKUBAVA, R. V. and MIKADZE, I. S., Tbilisi

[Abstract] The paper is concerned with a calculation of the probability characteristics of the performance of a computer with two forms of malfunction. After the first type of failure, conversion of only a distorted part of the program proceeds, and after the second type (steady failure) resetting of the computer and conversion of all the program from the beginning. The malfunctions are located by the program or program-built in method and the volume of computations is a random magnitude distributed according to an arbitrary law. The work done is a continuation of investigations in this direction, presented in five papers. I. S. Mikadze is the coauthor of two of these papers and the author of another. References 7 (Russian).

USSR   UDC △621.979.52.001.2 △62-52

AUTOMATION OF PLANNING IN THE PREPARATION OF PROCESSES FOR HANDLING PARTS
ON A TURRET-JIG PRESS

Moscow MEKHANIZATSIYA I AVTOMATIZATSIYA PROIZVODSTVA in Russian No 3, 1978
pp 38-39

RAKOVICH, A. G., candidate in technical sciences

[Abstract] The Institute of Engineering Cybernetics, Academy of Sciences
BSSR, has performed a number of studies on the automation of technical plan-
ning and design of machine tool accessory equipment. Programmed systems for
automated design of stamps, drilling attachments, metal-cutting tools and
systems have been developed and introduced. This article describes develop-
ments on automation of the planning of processes of handling parts on a tur-
ret-jig press. The systems developed perform the following functional tasks
in the automatic mode: reduction of the coordinates of apertures in parts
being worked to two mutually perpendicular bases; selection of the necessary
types of stamps and determination of their indices; formating and printout
of the necessary text documents; determination of the sizes of blanks; for-
mating of descriptions of drawings of blanks; preparation of programs for
manufacture of blanks on numerically controlled machines; preparation of
programs controlling the working of stamped parts on numerically programmed
turret-jig presses. The development of a batch of applied programs for
planning and technological preparation of production of parts on the turret-
jig press is now being completed at the Institute of Engineering and Cyber-
netics. This batch of programs will assure ease of adaptation of program
systems to varying production conditions and will greatly reduce programming
costs.

USSR   UDC 681.3:531.78.2

AUTOMATED STRAIN-GAGE SYSTEM OF MEASUREMENTS BASED ON THE "ELEKTRONIKA-100"
ELECTRONIC COMPUTER

Novosibirsk AVTOMETRIYA in Russian No 2, Mar/Apr 78 pp 83-85 manuscript re-
ceived 10 Jun 77

DEMIDOV, G. A., KISELEVA, G. I., KOZIN, G. A. and POLYUDOVA, A. M., Biysk

[Abstract] The results are presented of the creation of an automated sys-
tem of processing measuring signals from the pressure indicators [datchik]
of four experimental units. The 12-digit mini-electronic computer "Elek-
tronika-100" which enters into the system is supplied with an 8 K memory,
with a standard complex of input-output devices (printing, perforator, pho-
toreader), and with a built-in 10-digit analog-to-digital converter. Use
of an electronic computer makes it possible to increase the precision of
determining pressure by 4-5 times. Figures 2.

H. Other

HUNGARY

AN APPLICATION OF THE DOS-MM SYSTEM. THE MATERIALS-ACCOUNTING SYSTEM OF BVK

GAZDA, JOZSEF, senior department head, BVK [Borsod Chemical Combine], and
KOSZEGI, GYORGY, dr, department head, NIM IGUSZI [Industrial-Economy and
Enterprise-Administration Institute of the Ministry of Heavy Industry]

[Abstract] The DOS MM [management module] system for computerized enter-
prise information systems was developed for the R-10/12, R-20, R-30, and
other ESZR [Unified Computer System] units. It consists of two functional
parts: the APTRA (program to translate the adaptation parameters) and type
programs. The APTRA program reads in the commands formulated in the AP
language written on the blank forms in the course of parameter development,
and the read-in data are then processed in various modular stages. The read-
in AP record, the translated macroaddresses, and any errors are printed out.
During translation, a macrocommand sequence is generated, which ends with
the GENER to execute the commands. Then an ASSEMBLER translator is activated
to generate the user's runnable programs in the form of a macrocommand se-
quence. The materials-accounting operations at BVK were converted to use
the DOS-MM system. This enterprise uses an ICL 1903 and an R-20 computer.
A total of 63 programs had to be written for the project. Experience with
the application for about one year indicates that it functions properly and
realizes significant savings and increased efficiency. Figures 4; references
4 (Hungarian).

USSR

ELEKTRONIKA BZ-30 AND BZ-22 MICROCALCULATORS CREATED

Moscow SOVETSKAYA TORGOVLYA in Russian ("Novelties--78:   Microcomputers")
3 Aug 78 p 4

[Text] The family of miniature keyboard computers has been enlarged by two
new models.

The Elektronika BZ-30 is today's flattest and smallest microcalculator; its
weight totals 100 grams. It can carry out a large volume of mathematical
operations, including work with negative numbers, percents, a constant, and
the extraction of roots.

The Elektronika BZ-30 is reliable in operation--its designers "programmed"
it for 2500 hours of trouble-free operation. Specialists consider this to
be the best domestic model of the pocket microcalculators. Its approximate
price is 75 rubles.

The other model, the Elektronika SZ-22 belongs to the class of desk-top micro-
calculators. Intended for more complex calculations in diverse sectors of
the national economy, it contains a memory unit.

II. ECONOMIC APPLICATIONS

A. General Treatment

USSR

INCREASE OF EFFICIENCY OF AUTOMATIC MANAGEMENT SYSTEM

Kiev EKONOMIKA SOVETSKOY UKRAINY No 11, Nov 77 pp 83-84

GOLIKOV, V., dr in economic sciences

[Text] Progress in the automation of production management using computers is taking place at a rapid rate. During the Tenth Five-Year Plan the production of computer equipment increased by 1.8 times and the number of automated management systems [ASU] and subsystems in the republic's economy should stand at 780 at the end of the Five-Year Plan. Considering that the expenditures for setting up each system are counted in the millions of rubles, achieving efficiency in the systems installed and accelerating their repayment period are extremely important problems. A monograph[1] published recently was devoted to an analysis of this urgent but still little studied problem.

The book consists of an introduction and six chapters in which the results of the analysis are presented in logical sequence.

In the first chapter of the monograph, the basic methodological and organizational premises are analyzed which produce a decisive effect on the efficiency of automation of the management of enterprises.

The authors examine the structure of automated enterprise management systems [ASUP] which have been put into service and are operating in the Donbass and also in enterprises of the USSR Ministries of Heavy Industry, Transport and Power Machine-Building. They analyze the composition of subsystems, problems and the extent of the coverage of management functions by automation. Here, it is only right to point out that in the accumulated practice of installing ASUP, insufficient attention is being given to improving management methods. Designers and computer center personnel are primarily investigating means for processing information and improving the mechanical data processing parts of the systems. Operating ASUP do not solve future planning problems, the management of scientific and technical progress and other problems which significantly reduce the economic efficiency of PSU.

The authors base their proposals on the improvement of ASUP, the sequence of setting up their subsystems and the automation of functional problem solution. In our view, it would seem logical to dwell in more detail on the role of individual subsystems and of problems of establishing the economic effect of the starting complexes of ASUP.

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[1] N. G. Chumachenko, R. I. Zabotina, Ekonomicheskaya effektivnost' ASUP (Economic efficiency of Enterprise Automated Management System), Moscow, "Statiska," 1977, pp 176

48

In the second chapter, the overall requirements imposed on an enterprise management system are discussed along with the need for organizing economic analysis subsystems in ASUP.

Here, the authors correctly emphasize that during ASUP set-up, an important place should be assigned to a system for executing relevant operations of the enterprises (improvement of planning, data provision, stimulation and so on) which ensure that the ASUP will achieve a high economic efficiency.

Revealing the role and place of economic analysis at enterprises, the authors point out with good reason that setting up an economic analysis subsystem in the structure of ASU was not foreseen in the operating procedural materials for ASUP development and this decreases the quality level of such systems.

The third chapter is devoted to an analysis of the efficiency of operating automatic systems in practice. The importance of such a study is obvious, because the present lack of factual data on the economic output of management automation does not permit objective identification of methods for a continued increase in the efficiency of automatic control systems in industries. The authors, on the basis of the processing of a large amount of statistical data, analyze the status of cost recovery from ASUP and examine the problem of the effect of management automation on technical and economic indicators of the operations of industrial enterprises. Here, the conclusion is based on the fact that, at the present time, capital investments aimed at the development and adoption of ASUP are still used somewhat inefficiently.

In this same chapter, important problems in the further improvement of methods for determining the economic efficiency of ASUP are discussed and proposals are advocated for solving them.

We would like to point out a conflict in the authors' individual findings and the presentation in outline form of an approach to solving some of the problems. For instance, it is not entirely clear how to determine in practice for each actual problem the authentic norms for the probability of solving them accurately in a system, taking into account the conditions of the economic and organizational, mathematical, standardized assurance, the data processing quality and so on.

In the fourth chapter, a methodical approach is disclosed for determining the standard of the base data, during calculations of the economic efficiency of the ASUP and proposals are presented for classifying intraindustrial resources and determining the smoothness and uniformity of the manufacturing process.

Research on the intraindustrial resources made available with the introduction of ASUP is a positive feature of this particular section of the study. Their classification, presented by the authors, has a theoretical and practical value.

In the next two chapters, statistical and operational data on the availability to enterprises of the intraindustrial resources which can be employed while using ASUP are analyzed and a method for analyzing them is described. The authors cite interesting factual data on the laws governing variation in the indicators of the average annual output per worker in a number of the Donbass machine-building enterprises. They base their conclusions about means that are acceptable in practice for computing the prediced value of these indicators in individual enterprises on the achievement of calculated, planned, economic performance of ASUP.

The validity and reliability of the conclusions and proposals are ensured by drawing on a large amount of factual data obtained directly from the enterprises and associations. In the study, statistical and mathematical methods are used extensively for performing analysis. The use of correlation and regression models for predicting fluctuation in labor productivity should be mentioned along with the use of correlative models for studying the relationship between production uniformity and losses from defective products and from additional payments for deviation from the established manufacturing process and for calculating the smoothness and uniformity of an enterprise's operation using an average quarterly deviation.

The monograph does not lack specific deficiencies. Automatization of production management provides an increase in production efficiency if the methods and organizational structures of control are improved. And although the authors indicate this important point, they relegate the improvement of organized management structures to an insignificant place in the book.

The efficiency of starting complexes of ASUP is predetermined by their structure and the formulation of the problems being solved. The authors have analyzed a large number of operating ASUP, as the data given in the monograph demonstrates. It might also be mentioned that the recommendations on ASUP structure could be more complete. Besides, because the important question of determining the efficiency of each ASUP subsystem is raised, it would make sense to examine the composition of the recommended functional subsystems.

It seems that the referral of the data in table 40 (p 169) to the activities of the Donets machine-building plant imeni The Lenin Komsomol of the Ukraine is unjustified because it speaks of three arbitrary products although the products list issued by the plant is considerably more extensive.

The monograph reviewed describes the result of very timely research, and work in this direction will undoubtedly be continued. For this reason, the deficiencies named and others can be eliminated. On the whole, it may be said in conclusion that, in this comparatively small volume book, a concentrated account is given of the actual state of efficiency of operating ASUP. The findings and proposals are well-grounded and their use will make it possible to improve the economic returns of automated production management.

The book has a definite value for computer center staff members and ASUP designers and can be used for training personnel in automated data processing. In addition, it will make possible the development of a theory on the economic efficiency of automated management.

A SYSTEM FOR COMPUTERIZED ANALYSIS OF DEFECTS IN COMPLEX MACHINES

MISHCHENKO, ALEKSANDR ANDREYEVICH, candidate in technical sciences, VNIIPOU [expansion known] (Moscow)

[Abstract] A method and algorithm are suggested for determining the causes of defects by means of computer calculation, and the principles of design of an automated system for analysis of defects (SAD) in complex machines are suggested. The primary elements of a SAD are a computer center, computer learning tables, request and answer forms and a method for filling them out, an information coding method and an algorithm for calculation of the quantitative measure of importance of each defect cause and a decision rule for determination of the actual causes of defects. The SAD computer center coordinates all operations and determines (calculates) the true causes of defects. A flowchart illustrates the sequence of performance of operations in the SAD. The system is similar to the IBM system developed for the Ford Motor Company. It is a man-machine system, because listing of probable causes of defects, determination of the specific values of these causes, and filling out of request forms are performed by human diagnosticians. If all necessary information is transmitted to the computer by transducers, the system can be fully automated (without human intervention). Figure 1; references 3: 2 Russian, 1 Western.

POLAND

APPLICATION OF THE IBM PMS/360 SYSTEM TO PLANNING AND CONTROLLING THE
MANAGEMENT OF ENTERPRISES

GERTYCH, JERZY, Low-Capacity Motor Vehicle Factory, Plant No 2, Tychy

[Abstract] The applicability of network planning to the management of en-
terprises can be exemplified by the project of starting the production of
low-capacity Fiat 126p motor vehicles. .This task was entrusted to the Low-
Capacity Motor Vehicle Factory (FSM) in Bielsko-Biala. In view of the
planned acquisition of an IBM/370 computer, use was made of standard soft-
ware of PMS 360, version 2, provided by the producer, whose characteristics
are given, and the experience of its application, shortcomings of the uti-
lized version of the system, and modifications made in the programs, are de-
scribed.

Jerzy Gertych, M.A., graduated from A. Mickiewicz University in Poznan, De-
partment of Mathematics, Physics and Chemistry, majoring in chemistry (1965)
and in mathematics (1969). In the "Wloclawek" Ammonia Plant, he partici-
pated in elaboration and implementation of the control system of pipeline
deliveries and their assemblage. He also took part in the preliminary work
on optimization of the operation of the ammonia-producing installation. In
his work in the Low-Capacity Motor Vehicle Factory, he specializes in the
application of operational research to management. He was also occupied
with implementation of network planning methods in the project of starting
production of Fiat 126p motor vehicles. Figures 1; tables 1.

USSR   UDC 875.4-658.311.14

IMPROVEMENT OF THE STRUCTURE OF INDICES FOR ECONOMIC EVALUATION OF AUTOMATED
MANAGEMENT SYSTEMS

ABRAMOVA, T. S., engineer

[Abstract] The basic trends discovered in a retrospective study of methods
of evaluation of the economic effectiveness of automated management systems
[ASU] between 1959 and 1977 were found to be: expansion of the composition
of analysis functions; specialization of indicators of methods by stages of
the life-cycle of a system; increasing the number of technical and economic
indicators used; increasing the accuracy of calculation; changes in the
structure of indicators; and increased detail in calculation of each indica-
tor. A table of methods is presented. The author calls for the development
of a single system for evaluation of the economic effectiveness of AMS to
support the main function of economic analysis, and assurance of the effi-
cient and effective utilization of resources. Tables 1.

USSR   UDC 389:62-50

AUTOMATED MANAGEMENT SYSTEMS--METROLOGIC SUPPORT

DUDNIKOV, YE. G., dr in technical sciences, deputy director of scientific
work, State All-Union Central Order of the Red Banner of Labor Scientific-
Research Institute of Complex Automatization [TSNIIKA]; KOPELOVICH, A. P.
and MARKOV, B. F., candidates in technical sciences

[Abstract] An analysis of the operation of an automated management system
[ASU] indicated that there is a great need for the development of automatic,
highly productive methods and equipment for testing of information channels.
The use of methods of self-testing of information channels will eliminate
the need to dismantle these channels for testing, and will reduce the num-
ber of reserve instruments required. This and several other examples are
given of the insufficient current level of metrologic support of ASU, and
it is noted that these problems are primarily organizationzational in na-
ture, and extend through all phases of planning, construction and operation
of ASU. The authors call for a system of standards to serve as the juridi-
cal norms basis for metrologic support of ASU, to be correlated with the

state and branch standards already in effect and make their requirement for each ASU more specific. Another difficulty in the organization of metrologic services is the lack of any method for evaluating the economic effectiveness of the operation of such services.

USSR   UDC 389.1:62-50

BASIC PRINCIPLES AND TASKS OF AUTOMATED MANAGEMENT SYSTEM METROLOGIC SUPPORT

PRIBORY I SISTEMY UPRAVLENIYA in Russian No 3, 1978 pp 6-8

BAKHMUTSKII, A. A., ANIKIN, V. V., engineers; and MARKOV, V. F., candidate in technical sciences

[Abstract] A study is made of the principles of metrologic support of an automated management system [ASU] developed by the authors and the basis tasks which must be performed in order for these principles to be realized. The use of information-measurement equipment and measurement information in ASU requires metrologic support, meaning a combination of steps, methods, devices and norms intended to guarantee performance of information processes with a certain predetermined level of reliability. The importance of development of calculation methods for estimating the error of information channels and results of information processing flows from the need for simple methods to estimate error or develop a basis for the structure of information channels in systems and the selection of system components. This article basically represents an attempt to draw the attention of specialists involved in the development and operation of ASU to the importance of metrologic support for such systems. References 10 (Russian).

USSR

THE MANAGER AND HIS TOOLS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 14 Apr 78 p 3

SIMCHER, V., doctor in economic sciences

[Abstract] The dynamic growth of the Soviet economy requires necessary tools for coping with the increasing complexity of personnel management. Automatic management systems [ASU] as well as information and computation centers can play an essential role here, if properly organized. According to studies by the Institute of Cybernetics, Academy of Sciences Ukrainian SSR, these tools would relieve managers of enterprises from tasks they do but should not have

to perform, such as attending to matters which could be resolved at a lower level or following up orders which should be carried out without further reminders. The managers' real task is to ensure full political and professional competence of all personnel running the control apparatus, which essentially is a feedback system, and to utilize fully the manpower replaced by automatic machinery and control in industry and agriculture. Here is the role of the manager in an advanced socialist society. References 4 (Russian).

USSR

PROTOPOPOV CALLS FOR DEVELOPMENT OF UNIFIED SYSTEM

PROTOPOPOV, A., head of a sector of the Scientific-Research Institute For Control Systems, Tula

[Abstract] The good deal of work done thus far has as yet failed to bring about the development of a unified system of classification and coding of industrial and agricultural production yield. Specialists in the field of automated management systems [ASU] find it necessary to develop their own systems, which often prove to be confusing.

The USSR's GOSPLAN system uses code 381100 for "lathe-type machine tools"; however, the system of the Central Statistical Administration uses other codes for the very same system. For example, code 25020 denotes "non-rotary machine tools" and code 1121 denotes "centralized machine tools and screw cutting machines."

It is said that such practices will cause difficulties in introducing mechanization and automation of information processing. The author says, "A unified approach must be worked out towards the classification and coding of production yield just as in a planning or accounting system."

CZECHOSLOVAKIA

BALANCE AND ANALYSIS MODEL FOR DISTRIBUTION PROCESSES

SUJAN, IVAN, and MIKELKA, EDUARD, Computer Research Center, Bratislava'

[Abstract] The balance analytical model of distribution processes forms
part of a system of models describing macroeconomical analyses. This sys-
tem is being developed at the Computer Research Center, Bratislava. The
principles used in the design of the model are based on an econometric model
expressing relationships between many macroeconomical indicators, and on a
model of structural analysis, an income-consumption model, and a balance an-
alytical model of distribution processes. The model includes 42 equations
with 70 variables. The model will serve both for statistical purposes and
for planning of economic developments. It will be also used in the study of
distribution of the total National Product. Primary distribution and redis-
tribution of national resources can be studied by the model. Preliminary
results of computer application of the first aggregate version of the program
are discussed. Figures 1; tables 2; references 8: 7 Czech, 1 Russian.

CZECHOSLOVAKIA/EAST GERMANY

LINKING OF THE INPUT-OUTPUT ANALYSIS MODEL TO THE ECONOMETRIC MODEL OF THE
GERMAN DEMOCRATIC REPUBLIC

BIEBLEROVA, EDITH, Institute of Economics, Academy of Sciences, Berlin, East
Germany

[Abstract] A macroeconomic models system based on the ISI-1 econometric
model is being developed at the Academy of Sciences of the GDR. One part
of the study deals with the possible linkup of this model to the input-out-
put analysis model. This program can be used to study the influence of the
consumer demand on the volume and structure of the gross national product.
Results of this study seem to indicate that the program is adequate for the
investigation of the problems being studied. In future it will be necessary
to investigate the influence of consumer demand to omit the costs of invest-
ments for the production facilities, so that the satisfaction of the consum-
ers and of society could be guaranteed. In this way a better equilibrium
between production and demand can be established. The complete model of the
systems will have several iterative steps. Figures 1; tables 2; references
5: 2 East German, 1 Hungarian, 2 Western.

B. Bloc Cooperation

POLAND

TOPICAL PROBLEMS OF COMPUTERIZATION. PART 5: INTENSIFICATION OF COMPUTERI-
ZATION IN POLAND

CHELCHOWSKI, JERZY, Academy of Economics, Wroclaw

[Abstract] In this last article of a series devoted to computerization the
six essential conditions are formulated on which its successful development
in Poland depends, i.e., concentration of the existing cadre, improvement
and intensification of its training, increase in the use of uniform systems
and reproducible software, development of domestic production of certain
types of hardware, improvement of services rendered to users, and expansion
of cooperation within the framework of the JS EMC [Uniform System of Digi-
tal Computers].

USSR

COMPUTER NETWORKS

YAKUBAYTIS, E., vice-president Latvian SSR Academy of Sciences

[Abstract] Conversion of telephone and telegraph networks to data transmission networks, as well as installation of special networks for computer interfacing, presents new possibilities for fast exchange of information over long distances. There is a need, however, for better organized data banks and access to them, as well as for automated information retrieval, and for introduction of dialogue methods of communication. Research and development in these areas have resulted in a computer network including many machines, most diverse in sizes and types, spread over a large territory and collaborating in the solution of the most diverse problems. Such a network operates and provides many services by utilizing information processing techniques, information transmission techniques, logic and computation algorithms, and electronic postal-telegraph exchange techniques. Its one outstanding feature is the high degree of specialization and versatility. For the solution of attendant problems such as those of capacity, reliability, and interconnectability, a great deal of research on system complexing and resources utilization is underway at the Latvian SSR Academy of Sciences, in close cooperation with many scientific and industrial enterprises in other countries (USSR, GDR, Hungary, U.S., Austria, etc.). An interacademic experimental computer network is also being developed here, for the benefit of science, medicine, engineering, and the national economy. The main thrust of activity at this stage is in the area of organization. In the future there is foreseen a single system of networks spread all over the entire Soviet Union and providing all possible services, which includes controlling the national economy and thus ensuring solutions to even the most complex social problems.

USSR

COMPUTER APPLICATIONS IN CZECHOSLOVAKIA

BIRYUKOV, I., PRAVDA Correspondent

[Abstract] Prague, 17 July--Automated management systems are being utilized in such large Czechoslovak enterprises as the automobile plant at Mlada Boleslav and the "Chmelon" chemical plant at Humenne.

Recently the republic's first kraj computer center was constructed. It will process information received from enterprises and organizations in Central Slovakia Kraj.

Czechoslovakia is actively collaborating with other CEMA members in the field of computer technology and has taken part in the development of a number of third-generation computer models of the Unified System and various types of peripheral equipment for them. The country is also developing the "YeS-1025" electronic computer.

C.   Economic Control at Local Level

POLAND

VOIVODSHIP DATA BANK AS A TOOL FOR MANAGEMENT OF REGIONAL ADMINISTRATION

LANGER, ADAM, Vice-Voivod of Gdansk

[Abstract] Traditional methods of gathering and processing information at voivodship level are criticized and a concept of modern approach to this problem by using a voivodship data bank as a tool for management of regional administration is presented. The adoption is urged of the plan for the solution of this question adopted by the Voivodship Data Processing Center of Regional Administration in Gdansk based on normalized programmed moduli ensuring maximum flexibility required by fast changing needs of administration. The importance of punctuality, topicalness and good quality of data preparation is stressed. Figures 2.

Dr. Adam Langner graduated from Higher School of Economics in Sopot in 1956. In 1969-1972, postgraduate studies and courses connected with information science, and work in building industry and local administration, among other things as senior designer of SEPD [electronic data processing system] and director of Regional Information Science Center in Gdansk. In 1975, was conferred doctor's degree in economics. Was awarded 2nd Prize of the Minister of Administration, Regional Economy and Environmental Protection for the elaboration of a design of automatic rent settlement system. At present exercises functions of vice-voivod of Gdansk and is also chairman of Voivodship Coordination Group for Matters of Information Science.

USSR

REVIEW OF COMPUTER CENTERS COMPLETED AND WINNERS ANNOUNCED

Tashkent PRAVDA VOSTOKA in Russian ("Abreast of the Times") 5 Jul 78 p 2

[Abstract] A review of the operation of computer centers in Uzbekistan, in
which 54 centers participated, was carried out by decision of the Republic
Interdepartmental Council on Problems of Improving Control in the National
Economy. At the conclusion of the review, it was officially observed that
the review, as well as the fact that its intermediate results were summarized
in time for the 60th anniversary of the Great October Revolution, played an
important role in promoting scientific-technical progress. The review stimu-
lated the activity of the computer centers to a significant degree and con-
tributed to fulfillment of their plans and socialist responsibilities, to
improvement in work processes, and to more efficient use of computer tech-
nology. It was recognized as expedient to conduct additional review of the
republic's computer centers in the future, paying special attention to in-
creasing every way possible the efficiency of automated management systems
(ASU) and the use of computer technology.

The best computer center staffs [kollektivy] were awarded diplomas and cash
prizes by the Republic Interdepartmental Council on Problems of Improving
Control in the National Economy, the Republic Council of Scientific-Techni-
cal Societies, and the Commission on ASU's of the Republic Council for the
Promotion of Scientific-Technical Progress under the Central Committee of
the Communist Party of Uzbekistan.

First place in the review, as well as first-degree diplomas and cash prizes
of 500 rubles each were awarded to the staffs of the computer center of Tash-
kent Industrial Aviation Association imeni V. P. Chkalov and the computer
center of the Uzbek Scientific-Industrial Association "Kibernetika."

Second place, second-degree diplomas, and cash prizes of 400 rubles each
were awarded to the staffs of the computer centers of the "Sredazkabel'"
[probably "Central Asia Cable"] Association, the Administration of the Central
Asian Railroad, and the Tashkent Design and Planning Bureau for ASU's.

Third place, third-degree diplomas, and cash prizes of 200 rubles each were
awarded to the staffs of the computer centers of the following organizations:
"Tashsel'mash" Plant [Tashkent Agricultural Machinery Plant], the Ministry
of the Construction Materials Industry Uzbek SSR, Gosplan Uzbek SSR, and
the Administration of the Hydrometeorological Service Uzbek SSR.

Certificates of merit [pochyetnyye gramoty] were awarded to the staffs of the
Republic Computer Center of the Central Statistical Administration Uzbek SSR,
and the multiple-user computer center of the Tashkent House Building Combine
"Glavtashkentstroy" and to the staffs of the computer centers of the follow-
ing organizations: the Ministry of Geology Uzbek SSR, the Ministry of Power

Engineering and Electrification Uzbek SSR, Glavsnab [Main Administration for Material-Technical Supply] Uzbek SSR, ODU [expansion unknown] of Central Asia, Tashkent State University, "Uzgiprovodkhoz" [Uzbek State Institute for the Design of Construction Objects for Water Management] "TashZNIIEP" [Tashkent Zonal Scientific Research Institute of Experimental Design], the Central Asian Department of "Energoset'proyekt" [All-Union Order of the October Revolution State Design-Exploratory and Scientific Research Institute for Energy Systems and Electrical Networks], and the Scientific Research Institute of Power Engineering and Automation.

D. Extractive Industries, Fishing

USE OF MATHEMATICAL METHODS FOR OPTIMAL PLANNING OF THE UNIFIED GAS SUPPLY
SYSTEM CONSIDERING THE DYNAMICS OF ITS DEVELOPMENT

SHOR, NAUM ZUSELEVICH, dr in physicomathematical sciences, senior research
worker, Institute of Cybernetics, Academy of Sciences UkrSSR, Kiev; GALUSTO-
VA, LYUSYA ALEKSANDROVNA, candidate in technical sciences, senior research
worker, Institute of Cybernetics, Academy of Sciences UkrSSR, Kiev; MOMOT,
ALEKSANDRA IVANOVNA, senior engineer, Institute of Cybernetics, Academy of
Sciences UkrSSR, Kiev

[Abstract] The Institute of Cybernetics, Academy of Sciences, Ukrainian
SSR, in cooperation with the National Research and Planning Institute for
Gas Transportation, USSR Gas Industry Ministry, has performed studies and
calculations involving the application of generalized gradient methods for
optimal planning of the Unified Gas Supply System of the USSR (YeGS). The
task of development of the YeGS can be formulated as a task of determina-
tion of a system of variable indicators in a certain network, characteriz-
ing the changes of the technical and economic parameters of elements (sourc-
es, gas pipelines and consumers) with time, so that at each moment in time
the capacity of sources, flows of gas, capacities of gas pipelines and as-
signed values of gas consumption are organized so as to minimize costs. An
algorithm is presented for calculation of technical and economic character-
istics of the system. The first step in optimization of the gas system is
outlined in detail. Figures 2; references 4 (Russian).

MODELS AND ALGORITHMS FOR MULTILEVEL OPTIMIZATION APPLICABLE TO AN AUTOMATIC
MANAGEMENT SYSTEM FOR THE PETROCHEMICAL INDUSTRY

ALIYEV, R. A., ALIYEV, T. M., GADZHIYEV, A. M. and EFENDIYEV, I. R., Baku

[Abstract] Models and algorithms have been developed for the practical de-
sign of an automatic management system [ASU], namely one to be used by the
petrochemical industry in the production of alkyl benzene by the alkyization
process with sulfuric acid. This ASU is to optimize the yield and the quali-
ty of high-octane ingredients of aircraft fuels produced by that process.

The alkylization technology has been mapped into a plant flow chart representing a complex multilevel control object. Corresponding to it there has been constructed a mathematical model of production economy which involves reactor vessels and rectifier columns as well as storage tanks. The optimization problem is solved not by nonlinear programming, which would be very unwieldy because of the many equations and constraints, but by partial synthesis of optimal production management and multilevel optimization methods. The problem is treated as a Lagrange problem, with a single extremality ensured by convexity of quadrature functions and of the cost function. The overall program is outlined and the algorithm for the lowest-level is shown. The entire management system has been built around an ASVT-M-6000 computer and put into operation at the Novo-Bakinsk Petroleum Processing Plant imeni Vladimir Il'ich. Figures 3; references 5 (Russian).

E. Manufacturing and Processing Industries

SYSTEM FOR AUTOMATIC COLLECTION AND PROGRAM PROCESSING OF TECHNOLOGICAL
INFORMATION ON A ROLLING PROCESS

ZHADAN, VASILIY TIMOFEYEVICH, professor, MISiS [Moscow Order of the Red Ban-
ner of Labor Institute of Steel and Alkys]; BERKOVSKIY, VIKTOR SAMUILOVICH,
Candidate in technical sciences, MISiS; KOL'CHENKO, NIKOLAYIL'ICH, graduate
student, MISiS; RAZLADSKIY, ALEKSANDR ALEKSANDROVICH, engineer, (Zaporozh'ye);
and MIRONENKO, PETRALEKSANDROVICH, engineer (Zaporozh'ye)

[Abstract] The primary task of automatic control of a rolling mill is sta-
bilization of the technological parameters of the process. However, experi-
mental studies of the process using ordinary methods have been unsatisfactory,
primarily because of the impossibility of studying the required volume of
statistical samples. In order to solve this problem, Moscow's Institute of
Steels and Alloys, in cooperation with the Zaporozhskiy Administration of the
"Ukrtsentrspetsavtomatika" [Ukrainian Central Special Automatics] Association,
has developed and introduced an automatic system for collection and program-
controlled processing of technological information of the rolling process,
called SASPOTI, used with the 950 Mill of "Dneprospetsstal'" Special Steels
Plant. Information is collected from transducers located on the rolling
line and directly on each stand of the mill. The errors of the system are
analyzed. A simplified block diagram of the system and flowcharts of its
operation are presented. Information from the printers in the system is di-
rectly input to the Minsk-22 or Minsk-32 computer without additional process-
ing. Each channel of the system can be separately calibrated. The word
length of information carried in each channel is four decimal digits. Fig-
ures 2; references 4 (Russian).

USSR

A COMPUTER EXPERIMENT IN ECONOMICS

ZHUKOVSKIY, G., chief, Information and Computation Center at the Minsk Motorcycle Plant [Motovelozavod]

[Abstract] An experiment in accounting was set up on a "Minsk-22" electronic computer, for eventual replacement of manual bookkeeping at the Minsk Motorcycle Plant, to ensure a more reliable data processing as well as a better control of costs, inventory, and operations. The program provides for a more careful and factual depreciation and reinvestment schedule, very necessary for proper engineering-economic planning of production capacity in individual shops. The output information is given in tabulated and coded form, according to standard bookkeeping methods. Its implementation will practically eliminate all manual labor involved in data analysis. It will also result in a more efficient and less disorderly plant management, mainly because all service departments will be using the same information. The computer experiment was designed by Senior Engineer Ya. Lychova and Engineer-Programmer G. Semenova. Figures 1.

USSR   UDC   621.791.763.1:51.001.57

THE USE OF ELECTRONIC COMPUTERS IN SYSTEMS FOR AUTOMATIC CONTROL OF WELDING PROCESSES

PATON, B. YE., academician; PODOLA, N. V., candidate in technical sciences, Institute of Electric Welding imeni Ye. O. Paton, Academy of Sciences Ukrainian SSR

[Abstract] An analysis is presented of the possibility of application of LSI microprocessor technology to the control of automatic welding processes. A functional diagram is presented of a system for control of the process of arc welding. The functions of the automatic control system taken over by the computer are listed, and the advantages provided by the small size, low cost, flexibility and universality of microcomputers are noted. A 3-level hierarchical system for control of the welding process is presented, in which a number of microprocessors are controlled by an integrated welding process control system running in a third generation minicomputer, which in

turn is under the control of an Enterprise Automated Management System (ASUP), running in a still larger computer. Thus, the principle of distributed computing is combined in the hierarchical system with centralized management and control of the overall industrial process. Figures 3; tables 1; references 7 (Russian).

USSR

PROCESS CONTROL COMPUTER USED TO ANALYZE WORK QUALITY

ZHIKHAREV, YU., Chief, Electronic Computers, Chemical Plant imeni The Fiftieth Anniversary of the USSR Gomen, BSSR

[Abstract] When the plant experienced difficulty in analyzing the work of personnel servicing the sulphuric acid production equipment, which is 80 percent computer controlled, the computer itself was called upon to analyze the quality of servicing of the equipment it primarily controls. Every 6 minutes, the computer interrogates many sensors which reveal the status of the technological parameters of sulphuric acid production, mathematically analyzes the indications of the sensors and compares them with the optimal values, stored in machine memory. The results of this comparison are used to give a "grade," on a 10-point system, to the servicing crew, which is then used in socialist competition with other crews. Since the computer has been assigned this task, the "grades" received by the various servicing crews have increased from 5-6 points to 8.5-9.5 points (out of ten), indicating that the computer not only grades, but also helps to improve the quality of work done by human workers.

USSR

COMPUTER CENTER UNDER CONSTRUCTION AT KOLOMENSKIY DIESEL ENGINE-BUILDING
PLANT

Moscow IZVESTIYA in Russian ("Plant Computer Center") 12 Jul 78 p 1

[Text] Kolomna--Construction will soon begin of a computer center at
Kolomenskiy Diesel Engine-Building Plant imeni V. V. Kuibysheva. Experi-
enced specialists will service the new equipment. The erection of a con-
temporary computer center is part of the program for modernization and re-
construction of this important enterprise.

F. Power System

POLAND

COMPUTER-CONTROLLED STATE ELECTRIC POWER SYSTEM

BERNATOWICZ, KRYSTYN (text) and KLIMEK, ANDRZEJ (photos)

[Abstract] The structure of the Polish electric power system which controls
and distributes electric power on the territory of Poland and at points of
its junction with the USSR, Czechoslovakia and GDR is hierarchic and com-
prises four levels. The highest level is formed by the State Electric Power
Authority (PDM) to which are subordinated six district electric power centers
(ODM) [Warsaw, Radom, Katowice, Poznan, Wroclaw, Bydgoszcz] and--since re-
cently--the largest electric power generating facilities or groups of facili-
ties (large electric power plants). To ODM are subordinated two lower-level
electric power dispatching units whose areas correspond roughly to voivode-
ships and counties. Computerization was applied to the two highest levels,
i.e., PDM and ODM. The beginnings, progress and the functioning of the sys-
tem, as well as the role in it played at present by computerization and tele-
mechanics are described in considerable detail and illustrated by six photos
accompanied by captions which form part of the story.

1. A small staff of the Computer Systems Design Unit (4 designer-programmers,
4 perforators, and 2 assistants), headed by Dr. Engr. Henryk Gladysz, has to
its credit many systems put into operation for purposes of planning and sta-
tistics. The photo shows an incomplete team assembled round the computer
display--from left to right: team leader, Engr. Antoni Czernienko, M. A.,
and Engr. Jozef Kukla, M. A., Grazyna Rotkiewicz, Michal Cybin, Krystyna
Mesjasz, M. A.

2. Because only a part of the data for prediction systems is obtained from a teleprinter link, large batches of forms must be transferred to punched cards. Seated at the keyboards of SOEMTRONs are operators performing their daily duties (from left to right: Maria Jastrzebska and Barbara Kwiatkowska).
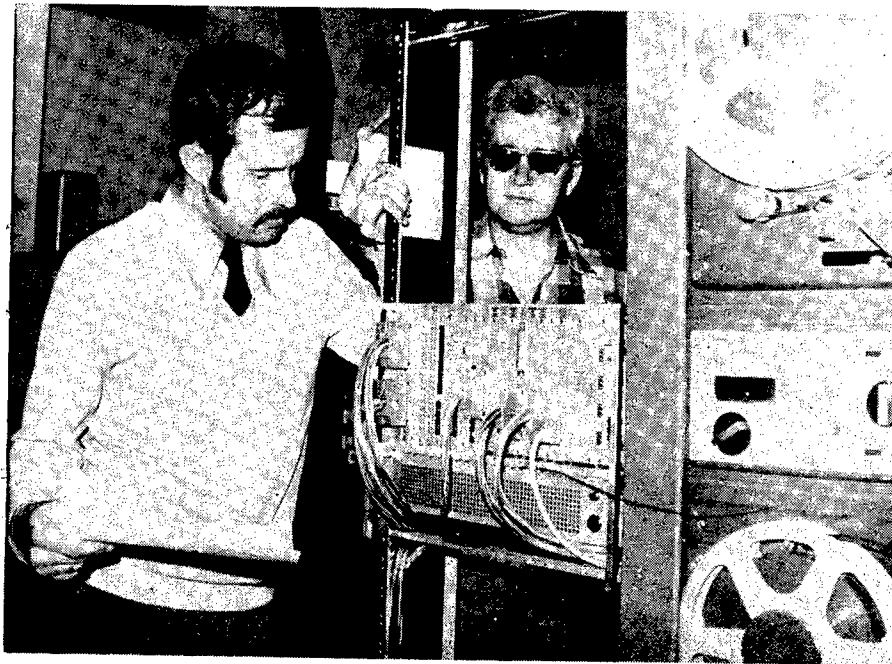
3. Against the background of a "native success" [rodzimego sukcesu] unit, which makes it possible to register the exchange of power within the range of the CEMA countries, Dr. Engr. Stanislaw Waniek and Engr. Janusz Barczak, M. A. are seen meditating. This time the night was quiet, but quite often they do not have enough sleep when they stay late at night with the equipment and the telephone calls them back from their homes. The specificity of work of the Computing Center makes it resemble that of the Ambulance Service.

4. Central Dispatch Room. It is here that the information data on the state of the electric power system of Poland converge. I cannot refrain from thinking how much depends on the alertness of these persons and how much they owe to computerization and the data processing systems of the State Power Authority. From left to right: Senior Dispatcher, Engr. Maciej Lepieszkiewicz, M. A., Head of Traffic Section, Engr. Mieczyslaw Pszozolkowski, M. A., Shift Operator, Engr. Zbigniew Miekus, veteran (by length of service) of the State Power Authority (28 years of uninterrupted work).

5. The real-time team cannot complain of the lack of interesting work. It is not by mere chance that the Chief of the six-person team (incomplete on the photo), Engr. Jerzy Sawicki, M. A. (first from the right) happens to stand near the CDC 1700 computer. Of an excellent design, though not the "last word of fashion,"--its serial production was started 10 years ago-- it is infallible in operation; equipped with an excellent operational system MSOS, it is, alongside the two CYBERs working in POLAND, a perfect testimonial in favor of the Control Data Corporation. Besides the Chief of the Team, the photo (from left to right) shows Engr. Grzegorz Konopka, Engr. Adam Romatowski, M. A., and Engr. Krystyna Maksymiuk, M. A.

6. The Section of Digital Technology is shown against the background of a second computer the CDC 3170. This computer, chiefly used for data processing, works under the surveillance of the operational MASTER system. A 14-person team headed by Eng. Zbigniew Maka, M. A. (in the middle) operates this computer. On the photo, the team leader is seen accompanied by operators (from left to right) Barbara Borkowska and Wanda Kraszczynska.

USSR

AUTOMATED MANAGEMENT SYSTEM FOR ELECTRIC POWER SYSTEM

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("ASU--in Action") 28 Jun
78 p 2

LIFANOV, V.

[Text] Tselinograd. The first stage of an automated management system
(ASU) has gone into operation at the Tselinnaya Power System, which supplies
electricity to Tselinogradskaya, Kokchetavskaya and Severo-Kazakhstanskaya
oblasts. Now the power engineers can more effectively use the electric net-
works and achieve a high-level resolution of engineering and technical prob-
lems.

G. Transportation System

KUDACHKIN, N., candidate in technical sciences, Central Scientific-Research
Institute of Economics and Operation of Water Transportation

[Abstract] Computer programs have been developed by the Central Scientific
Research Institute of Economics and Operation of Water Transportation
[TSNIIEVT], jointly with the Main Computation Center [GVTS] at the Ministry
of the River Fleet [MRE], for the purpose of processing data necessary for
checking and regulating the maneuvers of steamships moving in the Central
Basin and in the Northwestern Basin as well as along the interbasin routes.
The computer receives a large volume of input data about all vessels in the
traffic, basic ship and load data as well as data about their movements and
course. The programs provide for correcting erroneous information and com-
pleting insufficient information to be used in the next round. The volume
of output data is smaller and more concise, which is an advantageous feature
of the system. Some systematic errors in simulation and data processing
still need to be eliminated. Some computation difficulties, such as in the
use of "generalized" reference points, still need to be resolved on this
particular problem level as well as on the overall system level.

VYSOTSKIY, L., candidate in economic sciences, Central Scientific Research
Institute of Economics and Operation of Water Transportation

[Abstract] A subsystem for "management of harbor economy" is being devel-
oped by the Central Scientific Research Institute of Economics and Operation
of Water Transportation [TSNIIEVT], jointly with the Main Computation Center
[GVTS] at the Ministry of the River Fleet [MRF]. Its introduction will make
it possible to automate the solution of 10 tasks entering into the functions
of the apparatus of the Man Administration of Harbors of the MRF. The sub-
system includes a data bank for use in further research and analysis. The
output information is given in alphanumerical form. Thus six of these tasks
are already performed on an experimental basis. They basically involve oper-
ational reporting on and monitoring of: the presence of fleet vessels in
harbors and at customers' piers, the progress in loading-unloading activity,

the state of fleet vessels and harbor facilities, and the overhaul schedules.
The control subsystem provides for indication of "critical situations" in
each category on the basis of specific symptoms. Installation of the entire
subsystem is planned for 1979.

USSR

AUTOMATED CITY TRAFFIC CONTROL

Moscow TEKHNIKA--MOLODEZHI in Russian ["Go on Green"] No 5, 1978 pp 43-45

SMAGIN, BORIS, special correspondent of Tekhnika-Molodezhi

[Abstract] Alma-Ata, the capital of Kazakhstan, has installed a modern mo-
tor vehicle street traffic control system, including traffic sensors in the
pavement, communication lines and a central computer which plans the move-
ment of traffic and sequences green lights at various speeds down the major
streets of the city in order to keep traffic moving smoothly regardless of
variations in traffic load. The machine also displays a diagram of the en-
tire city so that the central computer operator can follow the flow of traf-
fic and watch for traffic jams throughout the city. Anticipating future
increases in complexity of both our knowledge of traffic patterns and the
numbers of variables which will be controlled by the traffic control system,
the Alma-Ata Traffic Service plans to replace the present Nairi control com-
puter with a more powerful M-6000 machine.

USSR

APPLICATIONS OF THE COMPUTER DISCUSSED

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian ["The Electronic Computer Problem
Solver, Manager"] 25 Jun 78 p 2

[Article by A. Arkhireyev, head of the Main Computer Center of the Kazakh-
stan Ministry of Motor Transport]

[Text] Within the republic there are some 34 motor vehicle control systems,
some 396 motor vehicle enterprises, thousands of people and machines--how
does one properly allocate the work force of such a large collective? How
does one distribute the technology? The managerial staff of the Kazakhstan

Ministry of Motor Transport has quite a few problems to solve in the course of operations. That is where our Main Computer Center (GVTs), equipped with the latest generation of computers, steps in to help.

A sector automated management system (OASU) has been set up within the ministry. The first phase of this system was developed during the last five-year plan. It became one of the first of its kind in the nation. Today the second phase of the (OASU) and automated enterprise management system is underway. Once the second phase is over, the task of automating the management at motor transport enterprises will be completed.

We already have in our electronic computer inventory hundreds of programs, which can solve all kinds of problems. The automated management system (ASU) of the shipment department, which Aleksey Aleksandrovich Baranov directs, is already figuring out how many motor vehicles are needed by the republic for hauling this years harvest.

How to raise the productivity of the motor pool, how to cut time for loading and unloading to a minimum, how to coordinate effectively the operations of threshing floors and grain receiving points--these are some of the problems which can be solved by the ASU-Shipment Department with the aid of its YeS-1022 electronic computer.

Time schedules, calculated according to the "Kolos" program, ensure an orderly supply of motor vehicles. At the same time it eliminates unproductive idling of vehicles and increases their productivity. In particular, during last years harvest 895 motor vehicles were released for other jobs, while 1,903,570 metric tons of grain were shipped according to the time schedule.

During the Tenth Five-Year Plan computer technology is being introduced at almost twice the rate as during the Ninth Five-Year Plan. The computational capacity of existing electronic computers will increase by more than five-fold.

H. Accounting and Statistical System

USSR

STOCKTAKING WITH THE AID OF ELECTRONICS

Kiev PRAVDA UKRAINY in Russian 20 Jun 78 p 1

PIVEN', V., chief, Municipal Information and Computing Center of the Central
Statistical Administration, Artemovsk, Donets Oblast

[Text] Each year the volume of information processed by our municipal com-
puter center increases. If 84 thousand rubles worth of mechanized working
out was produced in 1973, then in 1977 it was 153 thousand rubles worth.

The computer center operates on a self-supporting basis. Its material and
technology base grows stronger from year to year. The basic funds as of 1
January of this year amounted to 300 thousand rubles. The highly efficient
M-5000D punched card electronic computer complex was received last year.

Sixty-three clients are now using the computer center services, including
such enterprises as the Nonferrous Metalworking Plant imeni G. I. Kviring
the "Odezhda" firm, nine state farms and 13 rayon kolkohzes.

For example, the "Pobeda Trud" Plant receives each month reports on the
turnover of basic funds, amortization deductions in each shop, production
cost figures, etc. In furnishing the results of basic capital turnover for
the quarter, semester and year an enterprise is given various supplementary
information. Preparation of all of the documents with the aid of machines
takes a few hours, while a bookkeeper used to work on inventory and basic
capital turnover for an entire month.

Highly-qualified personnel are essential for efficient use of computer tech-
nology. Therefore our center spent around 2 thousand rubles in 1977 on
training courses alone for engineering and technical workers and mechanics.
We also operate ongoing advanced training schools.

Many of the center's workers handle their socialist obligations very well.
For example, the work of operators A. I. Radkovskiy, R. P. Dykaneva, Z. I.
Mezentseva and M. N. Koveleva was cited with the awards "Socialist Competi-
tion Winner" and "Achiever of the Ninth Five Year Plan."

In the third year of the Five Year Plan the collective of the municipal in-
formation and computer center of the Central Statistical Administration
pledged to perform 206 thousand rubles worth of work in terms of retail
value. This is significantly higher than in 1977. The fulfillment of the
pledge is going along successfully.

USSR

COMPUTER CENTER INSTITUTED AT KALININ OBLAST STATISTICAL CONTROL

Moscow PRAVDA in Russian ("Electronic Statistician") 23 Jul 78 p 4

YEGOROV, A., non-staff PRAVDA correspondent

[Text] Kalinin, 22 July--A government commission has signed a certificate of acceptance for a computer center for the Kalinin Oblast Statistical Administration.

The new center will allow the complete mechanization of the treatment of accounting and statistical documents.

I. Agriculture, Water Management, Land Reclamation, Sylviculture

USSR

AUTOMATED MANAGEMENT SYSTEM DESIGNED FOR SYRDAR'YA RIVER BASIN

Moscow PRAVDA in Russian ("ASU--Syrdar'ya") 12 Jul 78 p 6

GLADKOV, N., PRAVDA Correspondent

[Abstract] Tashkent, 11 July--The "Sredazgiprovodkhlopok" Institute [Central Asian State Institute for the Planning of Irrigation Structures (? for cotton) and Rural Electric Power Plants] has designed an automated system for the management of water resources for the Syrdar'ya River Basin, to be called "ASU-Syrdar'ya." The center itself will be located in Tashkent; dispatcher stations, each with its own computer, are to be located throughout Central Asia.

The great Central Asian river nourishes almost half of the country's cotton fields, which produce more than 3 million tons of cotton annually, and also supplies industrial centers. Its basin has 14 reservoirs with a capacity of 24 billion cubic meters. Throughout the 2-1/2 million hectares served by the Syrdar'ya run almost 1,000 canals, collectively 54,000 kilometers in length.

USSR

YeS-1022 INSTALLED AT "KAZGIPROVODKHOZ"

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian ("Electronics Helps the Designers") 20 Jul 78 p 4

DUNENKOV, M., Alma-Ata

[Abstract] A third-generation YeS-1022 computer has been installed and put into operation at the "Kazgiprovodkhoz Design Institute [probably Kazakh State Institute for the Design of Construction Objects for Water Management], whose computer technology department already has Nairi-S and M-222 computers.

The department was founded in 1968 as a computer technology group and at first used a Promin'-M computer to calculate volumes for excavation and earth moving, for statistical processing of laboratory analyses of soils, and, later on, for modeling filtration processes. Computerized modeling is now being used to forecast the level of subsoil water under the influence of filtration from canals and reservoirs, to refine hydrological parameters, and to study vertical and horizontal drainage.

III. SOCIOCULTURAL AND PSYCHOLOGICAL PROBLEMS

A. Human Factors Engineering and Man-Machine Systems

STRUCTURE AND BASIC APPROACHES FOR CONSTRUCTION OF A SYSTEM FOR PROBLEM
SOLVING BY NONPROFESSIONAL USERS

BERESTOVAYA, SVETLANA NIKOLAYEVNA, engineer, Cybernetics Institute, UkrSSR
Academy of Sciences (Kiev); VERNIK, LEONID VOL'FOVICH, engineer, Scientific-
Research Institute of Psychology (Kiev); and PEREVOZCHIKOVA, OL'GA LEONIDOVNA,
junior research worker, Institute of Cybernetics, UkrSSR Academy of Sciences
(Kiev)

[Abstract] A study is made of the specifics of systems oriented toward
users with no specialization, and a description is presented of a specific
system of this type, SP-YaOD, a part of the YaOD-75 man-machine data proces-
sing system developed in 1973-1975 by the Institute of Cybernetics, Ukr SSR
Academy of Sciences, in cooperation with the Ukrainian SSR Scientific Re-
search Institute of Psychology and run on a "Minsk-32" computer. The system
is based on the step-by-step principle of compiling, and includes a compiler
with external control and predetermined compiling step link. Each compiling
step includes program fragments consisting of a number of program units,
each of which is a description or an operator in YaOD. The technical char-
acteristics of SP-YaOD are as follows: length, 22,500 "Minsk-32" instruc-
tions, including 300 instructions for the executive routine, 10,500 for the
compiler, 8,200 for the interpreter with subroutine library, 1,200 I/O,
1,300 initial data preparation instructions and 1,000 program adjustment
instructions. The analyzers operate at 2,500 characters of input text per
minute during compiling. The speed of semantic analysis is 2-2.5 times
higher. The time required to produce an object program depends on the num-
ber of operators and their types, the total number of files processed and
their location on magnetic tape. Figures 4; references 8 (Russian).

B. Education

YUGOSLAVIA

COMPUTER APPLICATIONS IN THE STUDY OF CARTOGRAPHY

Zagreb GEODETSKI LIST in Serbo-Croatian No 1-3, 1978 pp 5-16

FRANCULA, NEDJELJKO, dr, The Geodetic Department, University in Zagreb

[Abstract] Since the operations in the school year 1972/73 of a UNIVAC 1110 computer at the university, cartography students have been assigned mathematical problems which involve meridian and parallel coordinates, contours, and deflection in surveying. Programs and subprograms used in these exercises are described, along with procedures used for azimuthal projections of several types. The use of a computer for teaching automatization in cartography involving cartograms written in FORTRAN-based programs is described, and factors in determining class boundaries are discussed. An example is presented of the use of this computer cartography to show population density in Croatia. Figures 8; references 6: 4 Serbo-Croatian, 2 English.

USSR

COMPUTER USED IN ADMINISTRATIVE WORK AT KHAR'KOV AVIATION INSTITUTE

Moscow PRAVDA in Russian ["The Computer in Examinations"] 9 Aug 78 p 3

[Abstract] The Admissions Commission of the Khar'kov Aviation Institute is now using a computer to store a wide range of information about student-applicants--from evaluations in basic subject certifications to general activities in industry or at school. The computer also monitors all stages of the entrance exams, and after they are completed it reports the passing grade, makes available lists of those who have been accepted, and draws up the enrollment forms.

The system described above, called "Abituriyent" ["Entrant"], is actually one of the nine subsystems of an automated data processing system that has been installed at the institute. The system also helps monitor the students' current progress, class attendance, examination results, and scientific research work.

C. Planning, Management and Automation of Scientific Research

A HYBRID SYSTEM BASED ON THE YeS-1010 COMPUTER AND MULTICHANNEL ANALYZERS

VINOGRADOV, ALEKSANDR ALEKSANDROVICH, engineer, IAE [Institute of Atomic Energy imeni I. V. Kurchatov], USSR Academy of Sciences (Moscow); PARAMONOV, VLADIMIR VASIL'YEVICH, candidate in technical sciences, IAE, USSR Academy of Sciences (Moscow); and SOLOV'YEV, VLADIMIR ALEKSEYEVICH, engineer, IAE, USSR Academy of Sciences (Moscow)

[Abstract] Computer-based real-time measurement systems are widely used in physics experiments. Hybrid measurement systems based on a small computer and a multichannel pulse analyzer or other digital measuring device with memory are of interest for use in spectrometric experiments. In the hybrid system, the computer performs the functions of testing, organization of the experiment and preliminary processing of the information. Routine data collection and storage operations are performed by the analyzers. It is important to organize interconnection between the computer and analyzers so that the analyzer functions as a peripheral device of the computer, i.e., analyzer memory is accessed by computer software on the initiative of the computer or in response to an interrupt signal from the analyzer. A system of this type using a YeS-1010 computer and an AI-4096 multichannel analyzer has been developed and is being put in use in the measurement center associated with the cyclotron of the Institute of Atomic Energy imeni I. V. Kurchatov. The system is briefly described and flowcharts of its operation are presented. Figures 2; tables 1; references 2 (Russian).

A MONITOR SYSTEM FOR DEBUGGING OF APPLICATION PROGRAMS IN AN AUTOMATED SCIENTIFIC EXPERIMENT CONTROL SYSTEM

ROSSOSHINSKII, DMITRIY ALEKSEYEVICH, engineer, Kiev Polytechnical Institute (Kiev)

[Abstract] The debugging system described processes the object code of the program being debugged after a message is received from the loader indicating the base, and the operator inputs the RUN instruction from the control panel. The primary distinction of this system from the AIDS and HELPER

systems is that information on the listing is available to the user after translation. This significantly reduces the usage of machine memory. The first version of the debugging system has been completed for use with an M6000 punch-tape system. It is possible to debug programs designed for operation with both the real-time DOS and the punch-tape system. Figures 2; references 5 (Russian).

AUTOMATIZATION OF MEASUREMENTS ON FOURIER SPECTROMETERS OF LONG-WAVE INFRARED REGION

VYSTAVKIN, A. N., OLEYNIKOV, A. YA., PANKRATS, YE. V., SMIRNOV, A. YA., STREL'NIKOV, V. N. and FURSHCHIK, A. B., Moscow

[Abstract] The results are discussed of work conducted in recent years on the creation of apparatus and software for experiments on Fourier spectrometers during investigations of the long-wave part of the far infrared range of wavelengths. Systems are developed, beginning with a comparatively simple control device for the Fourier spectrometer with information collection on a mechanical carrier, and ending with a complex consisting of experimental apparatus and an electronic computer "on line" with a wide collection of programs and peripheral equipment which assures the possibility of a choice of optimum conditions for conducting the experiments and a method for processing data in the case of a dialogue between the experimenter and an electronic computer. The systems for automatization of investigations are oriented to their use in scientific-technical laboratories. The concluding stage of development is a system based on the SM-3 electronic computer and the CAMAC technique, suitable for automatization of a wide range of optical spectral experiments and possessing great possibilities for growth. Use of the system makes it possible substantially to reduce irrational expenditures of time and considerably to increase the precision of the results of investigations. Figures 10; references 15: 14 Russian, 1 Western.

D. Machine Translation

USSR

PROGRESS ON MACHINE TRANSLATION IN USSR

Moscow IZVESTIYA in Russian ["The Electronic Translator"] 5 Jul 78 p 4

KONDRATOV, A., candidate in philogical sciences, member of the Scientific Council on Cybernetics of the USSR Academy of Sciences, Leningrad

[Text] More than a quarter of a century ago the idea of a machine translator was expressed. In the view of cyberneticists, the electronic brain of a machine can help humanity assimilate the tremendous stream of information that is falling upon us. In the descriptive expression of one specialist, the modern world is a gigantic translating machine working with ever increasing speed. Every day about 60 translated books come off the printing presses, several international meetings open, and dubbed films are shown on the screen. An infinite number of documents are being translated from various languages into others.

How can the translation process be automated? Many scientists and scientific collectives, in our country and other countries in the world, are devoting their efforts to solving this incredibly complicated but critically necessary problem.

Foreign scientists also participated in the Seventh All-Union Conference on Low-Temperature Plasma Generators, which took place at the Alma-Ata Power Institute. The delegates and guests were handed three compact, small books in red covers: English-Russian/Russian-English, French-Russian/Russian-French, and German-Russian/Russian-German minimum dictionaries. They were designed to be used in the reading of scientific texts on plasma as well as for conversations with foreign colleagues. The author of these dictionaries was the YeS-1020 computer at the Alma-Ata Power Institute. In three months the computer accomplished what normally takes several years!

This is only a small part of the work being undertaken by Soviet scientists in the "Statistics of Speech" group headed by the Leningrad professor, R. Piotrovskiy, and which brings together specialists from Leningrad, Chimkent, Minsk, Alma-Ata, Kishinev, and other cities.

Before us is a long piece of paper. At the top is printed the request: "Please define the general subject of the document." Further on comes the French text of the article on the technology of coloring. Below is the answer in Russian: "The document concerns the subject, 'Electrophoresis'." Then comes another request: "Please give a machine abstract of the document," to which the developed answer is immediately given: "The document examines the following subjects: the periodic system of coloring bath equipment, coloring by the electrodeposition method and its technical specifications," and so forth. Then—new questions, with answers following that reveal the article's content in detail.

"In this dialog, it would appear, there is nothing surprising," says
Piotrovskiy, "because it is precisely in this way that hundreds of abstract-
translators conduct a discussion with requestors. However, the resulting
text is a 'man-machine' dialog, in which man formulated the questions and
the machine gave answers in correct Russian, without any prompting. The
computer's teachers were linguists, chemists, and mathematicians from the
technical linguistics laboratory at the Leningrad Pedagogical Institute imeni
A. I. Gertsen and the Kishinev Polytechnical Institute.

"Technical linguistics," the professor continues, "is a young scientific dis-
cipline; it arose at the junction of technology and the humanities, which
would appear to be quite apart from the former. The main task of technical
linguistics is the adaptation of our language to communication between man
and machine. It is only taking its first steps, but it is already obvious
what wide perspectives are being opened for dialog between man and computer."

E. Artificial Intelligence

USSR

THE ROBOT GOES UNDER WATER

SOVETSKAYA ROSSIYA in Russian 26 Mar 78 p 4

ANIKEYEV, V., Vladivostok

[Abstract] A popular description is presented of an automatic submersible called "skat," which looks like two cylindrical tanks, but is actually a programmed, independently operating research submersible, in radio communication with acoustical buoys, and is used to photograph and otherwise study the bottom of the sea in its region of operation. It is predicted that such automatic submersibles will replace human beings in many areas of underwater research, thus reducing danger and increasing the accuracy of the results produced.

USSR

A VOICE-CONTROLLED ROBOT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ["I asked a robot"] 20 Apr 78 p 4

ALEKSEYEV, A.

[Abstract] This article reports a demonstration, conducted by Nikolai Sergeyevich Teleshov, Chief of the Robot Technology Sector of the Special Design Office [OKB] for Engineering Cybernetics, Leningrad Polytechnical Institute, of several experimental robots. One is programmed for repetitive operations, such as in assembly, and can be reprogrammed by its operator to modify the sequence of assembly operations. The second, called the "LPI-2" can respond to a short list of standard instructions such as "up," "stop," "left," "right" and "program one," pronounced by any speaker.

USSR

ROBOTS OF TODAY AND TOMORROW

Kiev PRAVDA UKRAINY in Russian 6 Jun 78 p 4

LEBEDEV, VLADIMIR KONSTANTINOVICH, academician, Ukrainian Academy of Sciences,
Deputy director, Institute of Electric Welding imeni Ye. O. Paton, Ukrainian
Academy of Sciences

[Abstract] In an interview with the correspondent of Pravda Ukrainy, V. K.
Lebedev tells about industrial robots. These robots, over 200 different
types of them, constitute the first generation and range from miniature to
gigantic ones. In appearance they largely resemble a machine and not at
all a human being. For many operations they are more adaptable than man:
they are more powerful, more enduring, and more immune to environmental
hazards. An experimental prototype of a robot for automatic spot welding
of automobile parts is now being built at the Gorkiy Automobile Plant. An-
other one, for automatic arc welding is scheduled to be available by 1980.
Meanwhile, the astronauts G. S. Shonin and V. N. Kubasov have performed ex-
periments on board "Soyuz-6" which will result in the use of robots for weld-
ing operations in outer space.

USSR

WORK ON SPOKEN MAN-COMPUTER COMMUNICATION

Moscow PRAVDA in Russian ["They're Teaching a Machine How to Speak"] 8 Jun
78 p 6

NOVIKOV, I., Pravda correspondent, Minsk

A computer-based information system that responds with a synthetic voice
output to dialed inquiries has been successfully tested by a commission of
the Ministry of communications of the Belorussian SSR headed by Minister
P. V. Afanas'yev. The system, which furnishes economic information, was
developed at the Laboratory for Speech Analysis and Synthesis of the Minsk
Section of the Central Scientific-Research Institute of Communications.
The laboratory is headed by Boris Mefodiyevich Lobanov.

Information furnished in the test situation included: the degree of ful-
fillment of the rate-income plan of the Brest Oblast Communications Adminis-
tration (100.2 percent); names of enterprises that failed to fulfill their
plan (Drogichinskiy Rayon Communications Center, 96.5 percent, Ivanchevichskiy

Rayon Communications Center, 96.8 percent), and basic technical information about the "Automatic Inquiry System"—main components: a speech synthesizer, an inquiry analyzer, and a "YeS 1022" computer.

Users dialing the device are welcomed by a dullish baritone voice with a barely perceptible metallic ring that intones the following opening phrases:

"Greetings, esteemed comrades! This is a computer speaking. Your telephone is connected to an experimental automatic inquiry system. Please make your inquiry." (Inquiries must be in the form of a dialed condition code—a two-digit number in the example given.)

The machine terminates inquiry sessions with the words:

"Thanks for your attention. Till next time."

The machine looks like an oscillograph and has a potentially unlimited vocabulary. According to Lobanov, the machine was developed following studies of the human speech apparatus, Russian speech articulation, and development of electronic imitators of sound types (so-called "phones,") that make up words. It forms words by combining sounds that make up words.

In a test, the synthesizer, designated the "Phonemophon-3," reproduced a small story about the "Hero City of Minsk" that had been fed to the machine via paper tape. The machine's voice output differed significantly from the indifferent presentation normally associated with robot mechanisms.

Voice characteristics that can be manipulated by the machine include: pitch (from treble to bass), timbre, and volume. This enables the device to reproduce both spoken sound and songs. However, the machine's singing is not yet competitive with human song.

A major goal of the research project is to enable computers to respond to spoken commands. Research, in addition to the work in Minsk, is being conducted in Moscow, Leningrad, Kiev, and Novosibirsk.

The Minsk synthesizer is of a fundamentally new type that earned its developers nine invention disclosures, according to Leonid Pavlovich Usov, head of the Minsk section of the Scientific-Research Institute. The prime interest of the Minsk section, according to Usov, is in automatic subscriber accounting and perfection of the telephone inquiry service. But the Minsk device will find application in many other branches of the national economy.

USSR

ROBOTS AT MOSCOW RAILROAD SERVICE BUREAU

ANDROSHIN, A.

[Abstract] At the Central Bureau of Service to Railroad Passengers [TsZhB] in Moscow, all the labor-consuming operations required to take passenger ticket orders have been delegated to robots.

The bureau currently has 60 robots in use to take orders from passengers for tickets via telephone. When a customer calls the bureau, the robot which answers the phone asks for the date of departure, name of station, number of tickets, the date the tickets are desired, and name and address of re-questor. This information is recorded on a tape recorder and a ticket is produced at the appointed time. Use of this automated system has increased production of ticket orders tenfold. Orders must be placed no later than 12 days before the projected date of departure.

IV. NATURAL SCIENCE RESEARCH

A. Biology and Medicine

USSR

HUMAN COMPUTER

Moscow LITERATURNAYA GAZETA in Russian ["Three, seven, four...Rare Gift.
How does he deal with it?] No 29, 19 Jul 78 p 13

BORODIN, ALEKSANDR

[Abstract] Among the four billions of people on earth, perhaps only several tens have the ability to work in their minds with multiple-digit numbers at the speed of contemporary electronic computers. "None of the possibilities of our brain appears so astonishing as the puzzle of wonder-calculators," points out author Victor Pekelis, one of the populizers of this phenomenon. The present article discusses the activities of Engineer Yuzef Zinov'yevich Prikhod'ko from Dimitrovgrad, who has such an ability. Almost up to his 30th year, Prikhod'ko did not suspect that his ability to calculate in his mind was unique, although it is true that neither in school nor in the halls of the Dnepropetrovsk Construction Engineering Institute where he spent his undergraduate years, did he use writing or a slide rule during calculations. About ten years ago Prikhod'ko decided to conduct several public appearances at schools and a local teachers' college, and after two years arranged on his own initiative a competition with an electronic computer at the Calculation Technics Pavilion of VDNKh [Exhibition of Achievements of the National Economy of the USSR]. This fact was noted in a number of central newspapers. Afterwards, no one was interested in Prikhod'ko's abilities. He lists a number of ways in which he thinks he could be useful and explains how he works with large numbers. At an unspecified time, Prikhod'ko visited the Computation Center of the USSR Academy of Sciences and competed with a "MIR-2" computer. Reasons are given why Prikhod'ko's talents are of little or no use to engineers and scientists.

V.   INFORMATION SCIENCE

A.   Information Services

POLAND

METHODICAL FOUNDATIONS OF IDENTIFICATION AND DESIGN OF INFORMATION SYSTEMS.
PART 1.   DECOMPOSITION OF ECONOMIC-PRODUCTION SYSTEM AND SEPARATION OF
INFORMATION SYSTEM

Warsaw INFORMATYKA in Polish Vol 12 No 10, 1977 pp 1-5

CHAJTMAN, SEWERYN, Institute of Organization of Machine Engineering Industry,
Warsaw

[Abstract] This is the first of a series of articles which constitute an
attempt at a new, systematized approach to the method of identification and
design of information systems. It analyzes basic phenomena and defines the
place of information system among other systems and in the superordinate
system. Criteria for classification of information and control processes
are discussed. Figures 5.

USSR   UDC   002.001(47+57)

STUDIES IN INFORMATION SCIENCE IN THE USSR (1968-1977)

MIKHAYLOV, A. I., CHERNYY, A. I. and GILYAREVSKIY, R. S.

[Abstract] Monographs in Soviet information science published in 1968-1977 numbered 120: theory of information science--28; scientific communication --13; storage and retrieval of scientific documents and data--57; distribution and use of scientific information--21; and history and organization of scientific-information activity--1. Dissertations in Soviet information science totaled 159: primary scientific documents and their flows--22; secondary documents and publications--26; information retrieval--58; information demand and its satisfaction--18; automation of information processes--14; automatic text reading--6; technical devices in scientific-information activity--4; and history and organization of scientific-information activity --11. Articles in NAUCHNO-TEKHNICHESKAYA INFORMATSIYA (series 1 and 2) published in 1968-1977 numbered 1520: general problems--252; scientific information and documents--124; information publications--141; information analysis--141; information languages--126; information retrieval systems--175; automated text processing--128; scientific-technical translation--14; software devices--80; information activity in the USSR--287; information activity in foreign countries--42; training and upgrading of personnel qualifications --10. French, West German and Polish usage of "informatics" is variously shown to denote "computer science," "programming" and "information science;" this ambiguity is to be regretted. References 19: 8 Russian, 11 Western. Appendix 1--references 120 Russian. Appendix 2--references 159 Russian.

USSR   UDC   025.4:658.012.011.56.001.2

APPLYING INFORMATION LANGUAGE FOR HIGHER EFFECTIVENESS IN DESIGNING AUTO-
MATED MANAGEMENT SYSTEMS

RUBAN, V. YA. and MEDVEDEV, A. A.

[Abstract] Automated management systems (ASU) can be designed with an information language. The information language described is a modification of the base information language used in the automated system of plan calculations (ASPR). It includes the following lists: subjects (1100 lexical units) [S-list]; economic categories (S'-list); units of measurement (E-list);

characteristics (70 items) [X-list]; values of characteristics (10,000 lexical units) [Z-list]; combinations of characteristics (2700 Q-sets) [Q-list]; and combinations of categories and characteristics (3200 SQ-classes) [S'Q-list]. Typical economic category subjects include: gross output, volume of capital investments and freight turnover; economic category predicates include: millions of rubles, billions of ton-km and thousands of units. In the description of indicators in the information language there are five levels of aggregation: level one breaks down the indicator into elementary components; level two codes the elementary indicator components; level three forms a set of indicator characteristics; level four obtains the convoluted code of the set of indicator characteristics; level five obtains the convoluted code of the class of indicators. Task analysis aims at selecting tasks that are equivalent by purpose, function and method of execution and at blocking duplication of indicators that are alike in input, output and information transition. Figures 1; tables 2; references 11 (Russian).

SERGIYENKO, IVAN VASIL'YEVICH, dr in physicomathematical sciences, Head of
Department, Institute of Cybernetics, Ukr SSR Academy of Sciences, Kiev; and
SKOPETSKIY, VASILIY VASIL'YEVICH, candidate in technical sciences, Head of
Department, Institute of Cybernetics, Ukr SSR Academy of Sciences, Kiev

[Abstract] Batches of applied programs (PPP) and automated data processing
systems (ASOD) have become widely used. The authors of this article suggest
the development of an automated system in which they call an "investigator"
["issledovatel"] for investigation of the effectiveness of PPP and ASOD during the planning and operational stages. The primary tasks of the investigator are to be: determination of the effectiveness of PPP and ASOD software, using various criteria; selection of the most effective data processing systems for a given class of problems; selection of classes of problems increasing the effectiveness of a given processing system; determination of the loading of individual subsystems of PPP and ASOD; determination of the most effective structures and method of construction of PPP and ASOD; and selection of the primary parameters of PPP and ASOD during the planning stage. An example of a block diagram of an investigator is presented, designed to operate in conjunction with the PPP, ASOD or other software which it is investigating. The operation of the investigator is very briefly described, and it is noted in conclusion that the problem of investigation of ASOD and PPP should be considered one of the necessary stages in their development. Figures 1; references 54: 48 Russian, 6 Western.

POLAND

DESCRIPTION OF INFORMATION RETRIEVAL SYSTEM SINFO 1300

BANKOWSKI, JACEK; FIALKOWSKI, KONRAD; ROLECKI, JANUSZ and RYBINSKI, HENRYK, Institute of Scientific, Technological and Economic Information, Warsaw

[Abstract] The SINFO information retrieval system was devised in 1975-1976 by the Institute of Scientific, Technological and Economic Information for use with ODRA 1300 computers. It was designed to be utilized in the libraries and specialized INTE [Scientific, Technological and Economic Information] centers in which ODRA 1300 computers are usually available. All programs used in this system are written in COBOL language, which makes it possible to utilize them in the future with computers of the Uniform System. Its software also permits collaboration with other interested centers. At present the SINFO system is being installed in the Specialized INTE Center (BOINTE) of the Institute of Power Engineering, in the BOINTE ZPC "Ursus," and in the Plant INTE Center of the Trans-Odra Machine Building Industry ZASTAL Plants in Zielona Gora. Characteristics of the system's software and its functioning are described in detail. References 4 (Polish).

PROBLEMS WITH A UNIFIED SYSTEM OF INFORMATION-RETRIEVAL LANGUAGES FOR DOCU-
MENTATION RETRIEVAL FROM A NETWORK OF AUTOMATED SCIENTIFIC AND TECHNICAL
INFORMATION CENTERS

KOLCHINSKIY, M. L.

[Abstract] Setting up a unified system of information retrieval languages
is seen as a necessity for users and for effective integration of a network
of automated scientific and technical information centers. In conventional
practice, such languages are divided into precoordinated and postcoordinated
ones, but such a differentiation is found to put classificational and de-
scriptional languages on opposite sides of the dividing line in an unreason-
able way. A division into groups not so strictly separate is deemed prefer-
able, namely into conceptual and verbal languages. While there are some
technical problems with the former and some application problems with the
latter, both types are essential for further development and integration of
various existing automated scientific and technical information systems.
A report read by the author at the All-Union Scientific Conference "Unified
System of Information-Retrieval Languages" (Yurmal, 1977) serves as the basis
for the present paper. References 21: 16 Russian, 5 Western.

UNIFIED SYSTEM OF INFORMATION RETRIEVAL LANGUAGES: DREAMS AND SOME TASKS

GAAZE-RAPOPORT, M. G.

[Abstract] In view of the controversy between advocates of classificational
languages and advocates of descriptional (verbal) languages, the concept of
a unified system of information retrieval languages is discussed here against
the background of complexity and problems of implementation. The desirable
features and characteristics of such a system are examined from the stand-
point of its purpose, namely description of information (target of retrieval)
and actual retrieval (description of inquiry). The so-called compatibility
requirement for such a system is found to be too restrictive. The following

are regarded as the major tasks in setting up such a system: developing a
unified general-purpose multilanguage part of any description of retrieval
targets, unification and official registration of all languages already
available and of those being developed, broad dissemination of knowledge
about all these languages, establishment of a special language tracking sys-
tem, and publication of terminologies, glossaries, interpretative diction-
aries, etc. A diagram is shown to illustrate the always available possi-
bility of using several classifiers rather one only in the retrieval process
and thus improving the result. In this particular example the target is
more narrowly and precisely defined by the intersection of three zones cor-
responding to three different target classifiers. It thus does not seem ad-
visable to seek a single all-inclusive detail-laden classifier, but rather
to several most appropriate ones for any given inquiry. Figures 1.

BULGARIA/USSR   UDC 025.4.03.001.5

ANALYSIS OF RETRIEVAL QUALITY INDICATORS

KHRISTOVA, L. N. and GYLYBOVA, S. D., People's Republic of Bulgaria

[Abstract] Service is now provided by the Bulgarian Central Institute of
Scientific and Technical Information in the field of computer engineering,
from data stored on magnetic tapes at the All-Union Institute of Scientific
and Technical Information. An experiment was performed to evaluate the re-
trieval quality indicators, namely the precision and the completeness of
information retrieved from a typical REFERATIVNYY ZHURNAL (AVTOMATIKA TELE-
MEKHANIKA I VYCHISLITEL'NAYA TEKHNIKA,* Nos 8-9, 1976), where only titles
(about 5 percent), brief annotations (about 10 percent) or abstracts (about
85 percent) appear. Sample inquiries were submitted on large-scale integra-
tion, design of logic circuits, and multiprogramming. The instructions for
retrieval were based on descriptors, following the Experimental Thesaurus
of the All-Union Institute of Scientific and Technical Information. Re-
trieval was effected in the dialogue mode on an IBM 370/35 computer with
the AQUARIUS subsystem of the STAIRS program deck. An analysis of responses
to 60 inquiries indicates that a "title and abstract" search yields most
complete (63.8 percent) and most precise (86.4 percent) information, while
"title alone" search yields least complete and precise information. These
percentage indicators represent mean completeness and precision factors for
a composite of primary-source material (from monographs, journals, patent

disclosures, dissertations, catalogues, standards, etc.) compiled in such a REFERATIVNYY ZHURNAL. Figures 6; tables 4; references 2: 1 Russian, 1 Western.

*[Abstract Journal, Automatics, Telemechanics and Computing Technics]

USSR

LOCAL DATA CONTROL COMPLEX

Moscow SOTSIALISTICHESKAYA INDUSTRIYA ["Industry Control Devices"] in Russian 2 Mar 78 p 4

[Text] Devices for the automatic control of technical processes find more and more use in industry. There are times when using computers for this purpose is a luxury. In this case "complexes of technical devices for local data control systems" can be of assistance. They carry out the functions of monitoring and control of technical processes, exchange information and "consult" with central computer complexes.

In these systems devices are necessarily used for program and logic control, to which pertains the newly developed Khar'kovskiy SKB [Special design office] system for automatic control, KM-2411. This complex is intended for the reception and processing of signals fed in from all the units and equipment during the manufacturing process. An important advantage of the Kharkov development lies in the fact that all the assemblies and blocks of the complex are standardized and put together on a uniform integrated circuit base. This guarantees the reliability and efficiency of the complex's operation.

The complex consists of a program and logic control unit with a memory block, mnemonics and a control console with display.

In the photograph: control console and display.
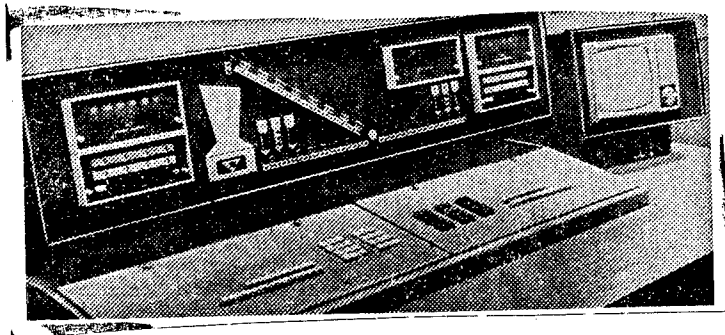
HUNGARY

CHARACTERS WITH DIACRITICAL MARKS

TOMCSANYI, GYULA, staff scientist; and ZILAHY, FERENC, department head,
Computer Applications Research Institute

[Abstract] Ten letters in the Hungarian alphabet have diacritical marks
not found in the English alphabet. In some data-processing applications
they must be rendered properly for various reasons. This involves modifi-
cations in the following areas: coding, data recording, data entry, data
checking, data transformation, data transmission, data processing, data
storage, data display, and compatibility. Various means for implementing
these modifications from the hardware and/or software angle are described.
Special attention is given to reducing the need for added characters, for
example by forming characters with diacritical marks by superimposing two
characters or one character and a symbol encountered on standard keyboards.
Greatest difficulties exist in the modification of line printers. ESZR
[Unified Computer System] equipment with Hungarian characters requiring
diacritical marks is not available. Some Western suppliers are prepared
to produce such equipment if the order is sufficiently large. VIDEOTON,
a Hungarian data-processing equipment manufacturer, does not offer such
equipment, nor does ORION and TERTA [Telephone Factory]. It is proposed
to study the problem and establish standards for dealing with them in such
a manner that equipment compatibility does not suffer. It may be possible
to make do with no more than four additional characters to reproduce Hun-
garian-language texts unambiguously. No references.

HUNGARY

APPLICATION STANDARD SYSTEM FOR AGRICULTURE

SZABO, JANOS, department head, and Mrs. SZABO, LASZLO, administrator, Com-
puter Technology and Enterprise Administration Enterprise

[Abstract] The article describes the AGIR-I information-processing system
developed for the modernization of the materials management and stock man-
agement operation of state farms. It permits several farms to use a compu-
ter on the basis of a common program system to obtain individualized

materials and stock handling information and related financial, accounting, statistical and management decision-making data. The projects involves unified coding methods, unification of the data carriers, and the development of standardized vouchers. There is a coordinated output selection and alternative use of the system for individual users is provided. Modular program packets are used, and prescribed reports to government authorities are also prepared. Among the specific services provided are purchasing, material consumption, production, internal material transfer, inventory, and sales related reports. The system described uses a FELIX C-256 computer, a 44 Kbyte central memory, a console, a card reader, a line printer, 3 magnetic-tape units (1600 bytes/inch), and two magnetic-disk units (25 million bytes per disk pack). The programs are written in IRIS-COBOL and LPG languages. The system is ready to accommodate additional users. It is operated from Kecskemet. Figures 5.

HUNGARY

DATA BANK SYSTEM USED BY THE COMPUTER-TECHNOLOGY AND ADMINISTRATION INSTITUTE OF THE POSTAL SERVICE

Mrs KENGYEL, MIKLOS, system designer, and SZUCS, JOZSEF, system designer, Computer-Technology and Administration Institute of the [Hungarian] Postal Service

[Abstract] The data bank system described serves to provide management information for upper-level management. The system is based on a Honeywell 2200 computer with a 160K memory capacity, 4 magnetic-disk units (9.2 million characters each), 8 magnetic-tape units, 1 card reader, 1 tape reader, 2 high-speed printers, multiplexers, and terminals. The programs supplied by Honeywell-Bull, the Communications Controller software, and the EASY-WRITER software are available. The subsystems include the management information service, the Telex-system priority system, the stock-management system, the personnel-administration system, and other systems related to the operation, administration, and optimization of the various postal services. The system is in operation and performs satisfactorily. Operation is easy, and the system is capable of being expanded. Expansion for additional uses is in progress. Figures 4.

USSR   UDC 658.512.2.001.2:681.3

INFORMATION SUPPORT OF PLANNING PROCESSES

YARMOSH, N. A., candidate in technical sciences

[Abstract] The composition and relative importance of requirements placed
on the data base for an automated planning system (ASP) may vary signifi-
cantly. They include: information support for both automated and manual
processes involved in planning; storage and retrieval of information gen-
erated as a result of planning processes; provision of sufficient informa-
tion storage capacity; assurance of sufficient system speed; provision of
the possibility to manipulate information; assurance of rapid changing and
adjustment of information as needed; and overall profitability of the sys-
tem. The basic principles involved in creation of an automated information
support system (ASIO) include: the principle of basing all planning tasks
on a single data base; the principle of compatibility of the information
retrieval language and the planning language; the principle of maximum com-
bination of data base and planning system hardware; the principle of inde-
pendent actualization; and the principle of self-organization. The struc-
ture and functions of a data base for ASP are briefly listed. Figures 1;
references 7 (Russian).

HUNGARY

MEDREK, A DATA-HANDLING SYSTEM ADAPTABLE TO APPLICATIONS

KALDI, TAMAS, staff scientist, Computer-Applications Research Institute;
and SZEPHALMI, GEZA, dr, department head, ASZSZ [State Administration Com-
puter Service]

[Abstract] The MEDREK data-handling system described allows data collected
from various sources to be processed according to a variety of considera-
tions. It is a data-handling program packet combined with an organization-
al system, capable of being adapted to many uses. It is capable of actual-
izing and interrogating an extensive data base (filling several tens of mag-
netic tapes), and also of generating the data base itself. The unit of in-
formation capable of being stored and retrieved in the system is the record.
Each record has five qualifiers which may also be expressed implicitly, and
which may have a note of any desired length. The types of interrogation pos-
sible are called ARCH OF, NAMES OF, and NUMBER OF. The results are: a set
of records, a vector with a given qualifier accompanying a given component,
or two vectors, respectively. The activities in the MEDREK system are tasks
seldom performed, before use, or during adaptation; tasks of the user dur-
ing operational running; and program services during operational running.
The MEDREK system may be regarded as a realization of the so-called Scandi-
navian school with some restrictions. Further improvement of the system
will provide loosening of the restrictions, speeding up of the slow batch-
time operation, and on-line access. Figures 9; references 12: 10 Hungarian,
2 Western.

USSR   UDC 002.5:65.011.56

EFFECTIVENESS OF KEYPUNCH OPERATOR LABOR

PIVOVAROV, A. N., candidate in technical sciences

[Abstract] Punching and verification are identified as the primary bottle-
necks and sources of error in automated data processing in automated manage-
ment systems (ASU). Results are presented from an overall estimation of the
effectiveness of the keypunch stage of data processing. It is determined
that better trained and more experienced operators can keypunch data faster
and make fewer errors than inexperienced or poorly trained operators.
Tables 1.

USSR

ONE POSSIBILITY FOR IMPROVING THE AUTOMATION OF DATA PROCESSING

IYERYUYUT, I., candidate in economical sciences

[Abstract] Third-generation computers represent one third of all computers
currently in use in Estonia. A shift from more primitive computers to third-
generation computers is an effective means for increasing the efficiency and
effectiveness of automated management systems [ASU] for enterprises and
branches of industry. The appearance of powerful, third-generation computers
makes it even more clear that the proper path to follow in developing the
Republic ASU is that of centralizing all computation functions in a few
large computer centers, the computing capacity of which will be shared by
individual enterprises and branches of industry, rather than distributing
computing capacity throughout the republic in small computer centers or in-
dividual enterprises, where hardware is often ineffectively used.

USSR

COMPARATIVE ANALYSIS OF COMPUTER-AIDED TREE-LIKE STRUCTURE ORGANIZATION

ZAVRAZHNOVA, M. N., Moscow

[Abstract] The hierarchical model of interface between data user and data bank, in the form of a tree structure, is considered, and several methods of data management with a computer are compared. This comparison is based on qualitative factors such as access techniques and memory characteristics as well as on quantitative estimates of such parameters as the search time. The data processing and storage methods thus evaluated include index-sequential, randomization, and dynamic ones. Figures 1; tables 1; references 10: 6 Russian, 4 Western.

B.   Information Theory

ANALYSIS OF SECRET SYSTEMS FROM THE INFORMATIONAL THEORY ASPECT

PETROVIC, PREDRAG, Graduate Engineer, the Research and Development Institute of the Electronics Industry, Belgrade

[Abstract]   The essay presents a general and comprehensive review of classical secret systems based on the Shannon theory, where the cryptoanalyst's possibilities for variations and computation are regarded as unlimited. The presentation, containing formulas and definitions as well as conclusions in the forms of theorems, is divided into a section defining the material to be covered, the manner of representation of the cryptosystem being analyzed, and information theory related to cryptological systems, stressing a perfect system as one where every cryptogram has equal a posteriori probabilities of presenting the message. Entropy of message source and key are discussed, and message and key equivocation and features of these concepts are presented. Two different ideal secret systems are discussed, one of which involves redundant language utilization. Figures 5; references 14: 11 English, 3 Serbo-Croatian.

VI. THEORETICAL FOUNDATIONS

A. Automatic Control and Control Systems

COMPARATIVE EVALUATION OF SEVERAL METHODS OF TESTING PERMANENT INFORMATION
IN AN AUTOMATED MANAGEMENT SYSTEM

PIBOBAROV, ALEKSANDR NIKOLAYEVICH, candidate in technical sciences (Leningrad)

[Abstract] Assurance of the correctness of information in an automated man-
agement system [ASU] represents a significant fraction of the total cost of
the system.   There are various methods for assurance of the reliability of
constant information: duplication of information or of information process-
ing operations; comparison of data with a list; visual checking of informa-
tion; the method of forbidding certain characters, and the mathematical
method based on check digits.   Considering the fact that symbol errors repre-
sent 65-75 percent of all errors, with about 98 percent single errors, the
author develops a mathematical criterion for evaluation of information quali-
ty, based on the sum of probabilities of character and format errors with and
without check digits.   Comparative evaluations are given of the quality of
the most effective and popular constant information testing algorithms used
at computer centers.   The forbidden symbol method is found to be ineffective.
Tables 5; references 17 (Russian).

CZECHOSLOVAKIA   UDC   62 - 501.22:681.3

OPTIMAL CONTROL SIMULATION ON A HYBRID COMPUTER

KONOPA, VOJTECH and NEUMENN, PETR, Research Institute of High Voltage Technology, Bechovice

[Abstract] A method for optimized control in real time using sensitivity methods is discussed. By means of these methods it is possible to find a correlation between the value of the condition of the controlled system and the original conditions of the conjugated system ψ (0), by which the problem can be solved. The full use of the method suggested by the authors requires the use of a completely balanced hybrid system HRA 7000. Integration of the equations for the matrixes of the system can be conducted on the analog section of the computer while the numerical section of the computer is used for multiplication of the matrixes, inversion of the matrixes, the iteration process proper, and the correction of the original estimates. This method is mainly effective in numerically sensitive problems. Practical realization of the control system can be undertaken advantageously on microprocessors. Because there is a direct correlation between the sensitivity equations and Ljapunov's stability, the stability of the system is solved simultaneously with its optimization. An example of a manipulator model with concentrated mass, corresponding to the useful load, is shown. Figures 7; references 5: 2 Czech, 3 Western.

USSR   UDC   389.1:681.325

METROLOGICAL SUPPORT OF COMMUNICATION DEVICES WITH THE OBJECT OF CONTROL OF
COMPUTER SYSTEMS

DIDENKO, K. I., Director-chief designer, Special Design Bureau (SKB), system
of automated management (SAU), candidate in technical sciences, SHANDRIN, I.
S., deputy director scientific work, candidate in technical sciences;
GAFANOVICH, M. D. and GLAGOLEV, G. I., candidates in technical sciences

[Abstract] The range of problems defining the metrological and accuracy
properties of a device for communication with the object of control in an
automatic control system is called the metrological support of the system.
Metrological support must guarantee proper estimation, regular normalization
and sufficient testing of the metrological characteristics of the hardware
included in the communication system. Methods of standardization and test-
ing of the metrological characteristics of a system encompass the static
mode, the dynamic properties of products and the influence of external ac-
tions. The metrological characteristics which are standardized are estab-
lished considering the actual metrological properties of specific products
and include: the static characteristics of transformation, systematic com-
ponents of error, random components of error, error which can be standard-
ized but need not be separated into systematic and random components, varia-
tions in output signals, dynamic properties and parameters of the output
signal which do not carry information. Requirements placed on the hardware
and software used for metrological testing are briefly listed. Figures 3.

USSR   UDC   620-50

ADAPTATION OF COMPLEX SYSTEMS

RASTRIGIN, L. A.

[Abstract] This paper, which was presented at the 17 Mar 77 session of a
presidium of the Latvian SSR Academy of Sciences, defines and discusses
types of complex-system controls that rely primarily on feedback analysis
to modify system state in order to achieve predefined objectives. It also
summarizes results of research in random-search techniques used in accom-
plishing system adaptation.

A complex system is defined as one whose state is defined by (1) the state of the environment influencing it and (2) the control on the system. The task of the control is to achieve predefined change(s) in the state of the system.

The paper distinguishes between system "compensation," in which the known mathematical model of the system is used to calculate its state and to modify it based on the calculated results, and system "adaptation," which relies primarily on analysis of system output to make changes to the system in order to influence its state.

Adaptation is divided into two major categories: "parameter adaptation," in which system parameters are altered in the search for the desired system state, and "structural adaptation," in which the structure of the system is modified to achieve the desired results.

The value is stressed of a random-search technique for system modification developed over the past 15 years by the Institute of Electronics and Computational Techniques [IEVT] of the Latvian SSR Academy of Sciences.

A Commission on Random Searching attached to the Scientific Council of the Presidium of the Academy of Sciences of the USSR was organized in 1970. It consisted of leading specialists of science research institutes, higher educational institutions and enterprises devoted to the theory and application of random searching.

During its existence the commission conducted two schools, three symposiums, and 11 workshops on different aspects of random searching. The commission issued a list of problems, three bibliographies, and two collections of papers on the subject, which are listed in the bibliography.

The successful application of methods of random searching to the solution of problems of parameter and structural adaptation focuses attention on the nontraditional approach to randomization inherent in the results of this body of experience. Randomization has changed from a secondary, minor factor to an effective means of solving complex tasks of control that acts as the source of the possibilities realized by a control system working on the basis of random-search algorithms.

If one considers that randomization generalizes all determined behavior, the importance of research in this nontraditional aspect of randomization becomes clear. The body of experience of the work done by the IEVT has shown that the researcher and the applied scientist can expect extremely interesting results from work in this field.

This circumstance focuses attention on the methodological aspects of utilizing random approaches. It is known that logical-probability concepts of science change as new results are obtained. An important role here is played by research on random searching and its application to the solution of problems of adaptation of complex systems.

The following "most interesting" applications of the random-search technique for parameter adaptation are listed:

1. Identification (i.e., synthesis via modeling) of complex systems.
2. Systematic planning of search experiments.
3. Grouping of effective algorithms.
4. Solution of Optimization Problems.

The paper distinguishes between two types of structural adaptation: "evolutionary adaptation," which involves minimal modification of system structure, and "alternative adaptation," in which the most effective algorithm for achieving the desired result is chosen from a "small" number of known alternatives on the basis of binary selection.

Examples of evolutionary adaptation given are: (1) Diagnosis of properties of chemical compounds on the basis of their structural formulas and (2) adaptive segmentation of systems, in which system elements are combined into segments to modify the system state.

Examples of alternative adaptation given are:

1. Selection of the most effective algorithm (or program) for processing information.
2. Adaptation of a computation network to user needs.
3. Selection of an adaptive set of optimization algorithms.
4. Structural adaptation of computer networks.

Figures 3; references 31 (Russian).

VII. GENERAL INFORMATION

A. Conferences

YUGOSLAVIA

THE TWENTY-FIRST YUGOSLAV CONFERENCE ON ELECTRONICS, TELECOMMUNICATIONS, AUTOMATION, AND ATOMIC TECHNOLOGY AND THE FIFTH YUGOSLAV CONFERENCE ON MICROELECTRONICS

MARICIC, ANDRIJA

[Abstract] The author of the report points out that while the need for minicomputers is felt by all domestic industries, domestic producers have failed to develop a coordinated developmental program, and the demands for protection of the electronics industry are not met. The failure of the higher educational system to adapt to the pace of technological development, and the stress on hardware aspects of education as opposed to software, are also pointed out. Concerning the conferences, it is pointed out that the difference between scholarly papers and simpler communications was seldom observed. The reports presented in the separate sections of the conferences are characterized. Sections included telecommunications, computer technology, electrical circuits, electronic component parts and materials, biomedicine, automatic controls, acoustics, electronics, physical chemistry, nuclear technology, robotics and artificial intelligence, and complex control systems. The conference on microelectronics had papers on applications, technology, and methods, design and physics, as well as two panel discussions.

USSR

DESIGN AUTOMATION CONFERENCE HELD IN TALLIN

Tallin SOVETSKAYA ESTONIYA in Russian ["Design Automation is on the Agenda"]
27 Apr 78 p 3

[Text] An international conference of experts from Bulgaria, Hungary,
Poland and the Soviet Union on the development of systems for automated de-
sign of machine-building products ended on 26 April in Tallin.

"The cooperation of a number of countries in developing automated design
systems makes it possible to reduce the time and cost of assimilating the
new technology and promotes an increase in the quality of design and assimi-
lation of products," said D. Krivomazov, director of the conference and the
Soviet delegation and section chief in the All-Union Scientific-Research
Institute of Standardization in Machinery Manufacture, in a conversation
with an Estonian News Agency correspondent. According to the protocol
signed by the participants in this 16th international meeting on this ques-
tion, significant tasks have been levied on the Institute of Cybernetics,
Estonian SSR Academy of Sciences, which will henceforth be engaged in the
major effort within the framework of the cooperation of the socialist coun-
tries in automated design.

B. Organizations

POLAND

COMPUTER SCIENCE ASSOCIATION'S ACHIEVEMENTS AND AMBITIONS

SUBSTYK, ZBIGNIEW, M. A., Director General of Computer Science Association, interview by Andrzej Klimek

[Abstract] The Computer Science Association represents 40 organizational units embracing about 15 percent of the total number of computers in Poland. It performs one third of the computer operations of the country and renders about 80 percent of computer-related services to various economic units. During the past 2 years the Association has doubled its services to the national economy while increasing its computing potential by only 15 percent. It has performed work estimated at 600 million zlotys for various sectors of the national economy, including the machine-building industry where materials management, production preparation, employment, wages, and allocation of costs were computerized. The Association will continue to expand computerization to those fields where it is purposive and profitable and the use of equipment and specialists is rational. The lack of a central recording system and coordination in the production of software leads to its excessive production and duplication and results in increased costs of computerization of the national economy. For example, costs of the production of software for a single materials management system amount to about one million zlotys, and it appears that there are already over 300 such systems in the country. To prevent software duplication appropriate regulations were introduced in 1977 by the Association, and in 1978 a catalog will be issued of recommended systems. In the field of basic software, efforts are focused on elaboration of technological versions of systemic software for RIAD computers of the Uniform System of the CEMA countries, and on the establishment and maintenance of a library of this software. The basic task of the next years will be to prepare software technology for computers of the fourth generation and especially for RIAD 2 computers. The Association will also embark on the great task of constructing the ZETO computer network. Likewise, new computing centers will be established in voivodeships of Suwalki, Lomza, Chelm, Przemysl, Tarnow, Nowy Sacz, Ciechanow, Ostroleka, Leszno and Gorzow, and in voivodeships of Koszalin, Krakow, Kielce and Poznan new facilities will be added to existing ones.

C. Personalities

USSR

CYBERNETICISTS ELECTED TO UKRAINIAN ACADEMY OF SCIENCES

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian ("Symposia, Conferences, Meetings--New Reinforcement for the Academy of Sciences Ukrainian SSR") No 2, Mar/Apr 78 pp 137-140

[Abstract] New members elected to the Academy of Sciences Ukrainian SSR at the Academy's general meeting on 31 March 1978 included several specialists in cybernetics. Igor' Nikolayevich Kovalenko and Vladimir Il'ich Skurikhin, both from the Institute of Cybernetics of the Academy of Sciences Ukrainian SSR, were elected to active membership in the Academy's Division of Mathematics, Mechanics, and Cybernetics. Another scientist who became an academician or active member of the academy in this division was Boris Borisovich Timofeyev, director of the Institute of Automation and member of the editorial board of the journal Upravlyayushchiye Sistemy i Mashiny [Control Systems and Machines]. Ivan Vasil'yevich Sergiyenko was elected a corresponding member of the Division of Mathematics, Mechanics, and Cybernetics, and Aleksandr Aleksandrovich Bakayev was elected a corresponding member of the Division of Economics. Both Sergiyenko and Bakayev work at the Institute of Cybernetics.

D. Publications

USSR

NEW BOOKS ON CYBERNETICS ANNOUNCED

Moscow KNIZHNOYE OBOZRENIYE in Russian No 19, 12 May 78 p 4

[Excerpts] SHURAKOV, V. V. and MOROZOV, V. P.--ZADACHNIK PO OSNOVAM ALGO-
RITMIZATSII, ALGOYAZYKAM I MASHINNOY OBRABOTKE (PROBLEM BOOK ON THE BASICS
OF ALGORITHMS, ALGOLANGUAGES AND MACHINE PROCESSING), Moscow "Statistika,"
1978; 198 pp, 20,000 copies printed, 70 kopecks--For high school students
specializing in the organization of mechanized processing of economic in-
formation.

BARABOSHKIN, A. M.--ELEKTRONIKA EPOS (EPOS ELECTRONICS--expansion unknown--),
Moscow "Statistika," 1978; 93 pp, 24,000 copies printed, 30 kopecks--Text-
book for workers in a machine-calculating bureau.

LEPIN-DMITRYUKOV, G. A.--PROGRAMMIROVANIYE NA YAZYKE PL/1 (DLYA DOS YeS EVM)
(PROGRAMMING IN THE LANGUAGE PL/1 (FOR THE DISK OPERATING SYSTEM OF THE YeS
COMPUTERS), Moscow "Sovetskoye radio," 1978; 288 pp, 54,000 copies printed;
1 ruble 10 kopecks.

MAKSIMOVICH, G.--BESEDY S AKADEMIKOM V. GLUSHKOVYM (CONVERSATIONS WITH
ACADEMICIAN V. GLUSHKOV), Second edition, revised, Moscow "Molodaya gvardiya,"
1978; 223 pp, "Eureka" series, 100,000 copies printed, 60 kopecks

OSNOVY PROYEKTIROVANIYA SLEDYASHCHIKH SISTEM (DESIGN FUNDAMENTALS OF SERVO
TRACKING SYSTEMS), edited by N. A. LAKOTY, Moscow "Mashinostroyeniye," 1978;
391 pp, 9,000 copies printed, 2 rubles

PAMPURO, V. I.--PROGNOZIROVANIYE STABIL'NOSTI INFORMATSIONNYKH USTROYSTV
(PREDICTING THE STABILITY OF INFORMATION DEVICES), Kiev, "Tekhnika," 1978;
248 pp; 3,700 copies printed; 1 ruble, 20 kopecks

TERMINAL'NYYE KOMPLEKSY V VYCHISLITEL'NYKH SISTEMAKH KOLLEKTIVNOGO POL'ZOVAN-
IYA (TERMINAL COMPLEXES IN MULTIPLE-USER COMPUTER SYSTEMS), Edited by E. A.
YAKUBAYTIS, Moscow "Statistika," 1978; 110 pp; 18,500 copies printed, 40
kopecks

CSO: 1863

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